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Report of the Scientific and Technical Subcommittee on its fifty-fifth session, held in Vienna from 29 January to 9 February 2018

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I. Introduction

1. The Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space held its fifty-fifth session at the United Nations Office at Vienna from 29 January to 9 February 2018, with Pontsho Maruping (South Africa) as Chair.

2. The Subcommittee held 20 meetings.

A. Attendance

3. Representatives of the following 75 States members of the Committee attended the session: Albania, Algeria, Argentina, Armenia, Australia, Austria, Azerbaijan, Belarus, Belgium, Bolivia (Plurinational State of), Brazil, Bulgaria, Burkina Faso, Canada, Chile, China, Colombia, Costa Rica, Cuba, Czechia, Denmark, Ecuador, Egypt, El Salvador, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Libya, Luxembourg, Malaysia, Mexico, Mongolia, Morocco, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Slovakia, South Africa, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Tunisia, Turkey, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, Venezuela (Bolivarian Republic of) and Viet Nam.

4. At its 875th meeting, on 29 January, the Subcommittee decided to invite observers for Cyprus, the Dominican Republic, Finland, Malta and Paraguay, at their request, to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.

5. At the same meeting, the Subcommittee decided to invite the observer for the European Union, at its request, to attend the session, in accordance with General Assembly resolution 65/276, entitled "Participation of the European Union in the work of the United Nations", and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.

6. Also at the same meeting, the Subcommittee decided to invite the observer for the Sovereign Military Order of Malta, at its request, to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that doing so would not involve any decision of the Committee concerning status.

7. Observers for the Food and Agriculture Organization of the United Nations, the International Atomic Energy Agency, the International Civil Aviation Organization (ICAO), the International Telecommunication Union (ITU), the World Health Organization (WHO) and the World Meteorological Organization (WMO) attended the session.

8. The session was attended by observers for the following intergovernmental organizations with permanent observer status with the Committee: Asia-Pacific Space Cooperation Organization (APSCO), European Southern Observatory, European Space Agency (ESA), European Telecommunications Satellite Organization, International Mobile Satellite Organization, Inter-Islamic Network on Space Sciences and Technology and International Telecommunications Satellite Organization.

9. The session was attended by observers for the International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG), in accordance with the agreement of the Subcommittee at its fifty-third session (A/AC.105/1109, para. 182).

10. The session was attended by observers for the following non-governmental organizations having permanent observer status with the Committee: African

Association of Remote Sensing of the Environment, Committee on Space Research (COSPAR), Eurisy, European Space Policy Institute (ESPI), International Academy of Astronautics (IAA), International Association for the Advancement of Space Safety, International Astronautical Federation, International Astronomical Union, International Society for Photogrammetry and Remote Sensing, International Space University (ISU), National Space Society, Prince Sultan bin Abdulaziz International Prize for Water (PSIPW), Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), Secure World Foundation, Space Generation Advisory Council (SGAC), University Space Engineering Consortium-Global (UNISEC-Global) and World Space Week Association (WSWA).

11. Also at its 875th meeting, the Subcommittee decided to invite observers for the International Organization for Standardization and the Organization on Space Technologies for Societal Applications (Canada-Europe-United States-Asia), at their request, to attend the session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that it would not involve any decision of the Committee concerning status.

12. The Subcommittee took note of the application of Mauritius for membership in the Committee (see A/AC.105/C.1/2018/CRP.4).

13. The Subcommittee also took note of the application by the International Organization for Standardization for permanent observer status with the Committee (see A/AC.105/C.1/2018/CRP.5).

14. A list of the representatives of States, United Nations entities and other international organizations attending the session is contained in A/AC.105/C.1/2018/INF/47 and A/AC.105/C.1/2018/INF/47/Corr.1.

B. Adoption of the agenda

15. At its 875th meeting, on 29 January, the Subcommittee adopted the following agenda:

1. Adoption of the agenda.
2. Election of the Chair.
3. Statement by the Chair.
4. General exchange of views and introduction of reports submitted on national activities.
5. United Nations Programme on Space Applications.
6. Space technology for sustainable socioeconomic development.
7. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment.
8. Space debris.
9. Space-system-based disaster management support.
10. Recent developments in global navigation satellite systems.
11. Space weather.
12. Near-Earth objects.
13. Use of nuclear power sources in outer space.
14. Long-term sustainability of outer space activities.
15. Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to

developments in space communications, taking particular account of the needs and interests of developing countries, without prejudice to the role of the International Telecommunication Union.

16. Draft provisional agenda for the fifty-sixth session of the Scientific and Technical Subcommittee.

17. Report to the Committee on the Peaceful Uses of Outer Space.

C. Election of the Chair

16. At its 875th meeting, the Subcommittee elected Pontsho Maruping (South Africa) as its Chair for the period 2018–2019, pursuant to General Assembly decision 72/518.

D. General statements

17. Statements were made by representatives of the following member States during the general exchange of views: Algeria, Argentina, Austria, Belarus, Brazil, Canada, Chile, China, Cuba, Czechia, Denmark, France, Germany, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Kenya, Mexico, New Zealand, Nigeria, Norway, Oman, Pakistan, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Saudi Arabia, South Africa, Sri Lanka, Switzerland, Ukraine, United Kingdom, United States, Venezuela (Bolivarian Republic of) and Viet Nam. Statements were also made by the representative of Argentina on behalf of the Group of Latin American and Caribbean States and by the representative of Egypt on behalf of the Group of African States. The observer for the European Union also made a statement. The observer for WMO made a statement. Statements were also made by the observers for APSCO, COSPAR, ESPI, Eurisy, the International Astronautical Federation, the International Astronomical Union, the Inter-Islamic Network on Space Sciences and Technology, ISU, SGAC, the Secure World Foundation, UNISEC-Global and WSWA.

18. The Subcommittee heard the following scientific and technical presentations:

(a) "Austria in space", by the representative of Austria;

(b) "IAA report of activity", by the observer for IAA;

(c) "Recent accomplishments of SCOSTEP in Sun-Earth connection studies", by the observer for SCOSTEP;

(d) "Role of the middle atmosphere for climate", by the observer for SCOSTEP;

(e) "United States commercial space transportation regulations", by the representative of the United States;

(f) "The belt and road space information corridor as a driver for socioeconomic sustainable development", by the representative of China;

(g) "Technical University Vienna space team: a students' initiative with emphasis on aerospace engineering", by the representative of Austria;

(h) "Italian engagement in capacity-building activities in Africa", by the representative of Italy;

(i) "New thrust in the Indian space programme: a glance", by the representative of India;

(j) "ISU Team Project ARESS: a road map for emerging space States", by the observer for ISU;

(k) "Vision 2030-All: How can we contribute to sustainable development through capacity-building programmes in the field of space science and technology?", by the observer for UNISEC-Global;

(l) "Lunar lava tube and its skylight hole", by the representative of Japan;

(m) "Outcome of the Space Generation Congress", by the observer for SGAC;

(n) "Cost-effective, high-bandwidth connectivity to rural points on Earth utilizing nanosatellite technologies", by the representative of Israel;

(o) "SUCHAI: the first satellite built in Chile", by the representative of Chile;

(p) "Academy of Sciences' research: technological programmes aimed at the development of the Belarussian aerospace sector", by the representative of Belarus;

(q) "Nahid-1 satellite" by the representative of the Islamic Republic of Iran;

(r) "BRITE constellation: scientific highlights of five years of operation", by the representative of Austria;

(s) "Development of the outer space activities of Kazakhstan", by the representative of Kazakhstan.

19. The Subcommittee welcomed Bahrain, Denmark and Norway as the newest States members of the Committee, bringing its membership to 87 States. The Subcommittee also welcomed the European Science Foundation, represented by the European Space Sciences Committee, and UNISEC-Global as the newest permanent observers of the Committee.

20. At the 875th meeting, on 29 January, the Chair of the Subcommittee made a statement outlining the work of the Subcommittee at its fifty-fifth session. She brought to the attention of the Subcommittee several provisions contained in General Assembly resolution 72/77 that pertained to the current work of the Subcommittee. She drew particular attention to the fact that the General Assembly had emphasized the significant progress made in the development of space science and technology and their applications that had enabled humans to explore the universe, and the extraordinary achievements made in space exploration efforts. She noted that the General Assembly had recognized the unique platform at the global level for international cooperation in space activities represented by the Committee and its subcommittees and assisted by the Office for Outer Space Affairs of the Secretariat. She also noted that the General Assembly had welcomed the adoption by the African Union of the African Space Policy and Strategy. She further noted that the African continent could benefit greatly from strengthened space policy, capabilities and infrastructure.

21. At the same meeting, the Director of the Office for Outer Space Affairs made a statement in which she reviewed a number of important areas of the Office's activities, namely, capacity-building and measures to strengthen and broaden it; the facilitation of international space cooperation, the building of partnerships and the coordination of space projects carried out by States and other actors; the promotion of the utilization of space technology within the United Nations system; and the development of cooperation between the Office and industry and the private sector, based on the corresponding rules and principles of the United Nations.

22. The Director drew the attention of the Subcommittee to the fact that a number of factors had considerably changed the way the Office could effectively plan, manage and implement its mandated activities. Those factors were the implementation of the United Nations enterprise resource planning system, Umoja; the increase in requests from Member States; and the additional mandate of the Office relevant to the fulfilment of the Sustainable Development Goals. She stressed the current, unfavourable financial situation of the Office and highlighted the importance of having financial and other resources available for the successful implementation of its programme of work.

23. Also at the 875th meeting, Johannes Huisman, Director of the Programme Planning and Budget Division of the Department of Management of the Secretariat, made a statement in which he outlined and clarified the budgetary principles, practices and aspects of the substantive intergovernmental processes, including in the context of the programme on the peaceful uses of outer space.

24. The Subcommittee noted with appreciation the establishment at United Nations Headquarters, under the leadership of the permanent missions of Austria and Zambia, of the Group of Friends of the Office for Outer Space Affairs.

25. The Subcommittee agreed that UNISPACE+50 offered a unique opportunity for countries to reflect on the achievements of more than 50 years of space exploration and to look towards the future, strengthening the mandates of the Committee, its subsidiary bodies and the Office as unique platforms for international space cooperation, in order to align their work with the current challenges and opportunities in the space arena, and making them fit for purpose and responsive to new realities in space endeavours, such as an ever-growing number of actors, the diversification of such actors and the diversification of space activities.

26. The Subcommittee noted the Secretary-General's system-wide efforts to engage with Member States to reform the work of the United Nations, overcome silos and deliver as one, and also noted that outer space was a vital part of the issues that the Secretary-General had identified in the priorities of the reform.

27. The Subcommittee noted that Member States had consistently reaffirmed, in intergovernmental agreements, the need for gender equality and the empowerment of women, and that the 2030 Agenda for Sustainable Development had provided additional momentum and clear targets. In that regard, the Subcommittee noted the development by the Office for Outer Space Affairs of the "Space for women" initiative to promote gender empowerment and gender equality, not only within the United Nations, but also within the space sector.

28. The Subcommittee noted that, in 2017, over 450 functional space objects had been launched or deployed into Earth orbit or beyond, nearly double the number launched in 2016. In that connection, the Subcommittee noted that the Office was of the view that such a substantial increase in the number of space objects launched could impact existing national registration mechanisms and that it was important to improve the efficiency of the mechanism used by States of registry to provide information to the Secretary-General.

29. The Subcommittee agreed that, without space science and technology, and in particular without communication and navigation systems and Earth observation, it would be impossible to meet current and future challenges to social and economic development and sustainability, such as natural disasters, food security, climate change and natural resource security. The Subcommittee emphasized that space activities were also crucial to supporting sustainable development, in particular as part of efforts to support sustainable economic growth, improve quality of life and manage the global environment.

30. The Subcommittee noted the instrumental role it had played in the development of the legal regime governing the use of outer space activities for peaceful purposes and in efforts to provide a unique multilateral platform at the global level for enhancing international cooperation for the benefit of all countries, in particular in the area of using space applications for sustainable development, including within the context of the 2030 Agenda for Sustainable Development.

31. The Subcommittee welcomed the adoption by the General Assembly, in its resolution 72/78, of the Declaration on the fiftieth anniversary of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. In that Declaration, among other things, Member States had reiterated the importance of the principles contained in General Assembly resolution 1962 (XVIII), entitled "Declaration of Legal

Principles Governing the Activities of States in the Exploration and Use of Outer Space".

32. Some delegations reiterated the importance of ensuring equitable access to space technologies and applications by all States, in particular developing countries, and that UNISPACE+50 would go a long way towards recognizing such needs. The delegations expressing that view were also of the view that sharing experiences, technology and initiatives would help to bring the benefits of outer space activities to all humankind.

33. Some delegations expressed the view that space was a global commons on which the daily life of humankind increasingly relied, and that space technology and applications had great potential to help achieve the goals set out in the 2030 Agenda for Sustainable Development. The delegations expressing that view were also of the view that it was important to build good governance within the space arena, and that UNISPACE+50 could contribute to that goal by: (a) mobilizing the space economy to help create jobs and economic growth; (b) mobilizing space technology and applications for societal objectives such as improving global health (related to Sustainable Development Goal 3) and increasing the resilience of societies to climate change, disasters and space hazards; (c) increasing access to space-based data and applications to help all actors to play a role in the achievement of the Sustainable Development Goals; and (d) enhancing the sustainability of outer space activities.

34. Some delegations recognized the benefits derived from the sustainable and exclusively peaceful uses of outer space and reaffirmed that such uses were essential to present and future generations. In that connection, those delegations noted that the international community should seek ways and means of avoiding an arms race, and should consider the broader perspective of space security and associated matters, as reiterated by the General Assembly in its resolution 72/77.

35. The view was expressed that, given the current turbulent political climate and the attempts to apply geopolitical schemes with regard to outer space, it was important to understand whether it would still be possible to develop a common strategy for the Committee's activities as a unique international forum for the formation of space policy and development of international space law, which would be shared by all its States members. Such a strategy was greatly needed in order to strengthen the Committee's potential to integrate the will and intentions of States, which was important in view of increasing divergence in the intellectual trends of modern space policy.

36. Some delegations expressed the view that space exploration activities should be conducted with due regard to international peace and security and that outer space should never become a theatre of war. The delegations expressing that view were also of the view that States should commit in earnest to the prevention of an arms race and refrain from placing and using weapons in outer space.

37. The view was expressed that the outer space environment was threatened not only by physical elements, such as increasing amounts of debris, but also by conflicting economic and political interests, and that solutions to such challenges could be found through the work of States within the framework of the Committee and its subcommittees.

38. The view was expressed that safety and security in outer space, which were essential for space activity and strategic stability, and the level of partnership in space exploration and use, were defined by the correlation between and interaction among many factors. In that connection, it was important to protect space activity from geopolitical turbulence while responding to challenges to safety and security in outer space through the joint efforts of States.

39. Some delegations expressed the view that changes in the reality of outer space activities, which presently included an increasing number of State and non-State actors, were both a challenge and an opportunity, and that the Committee had the

mandate to discuss the reality of outer space exploration and the issues arising from commercial exploitation activities.

40. The view was expressed that analysis of the negative trends in current international relations indicated uneasy times ahead, and that the entire system of international space law would be put to the test. That presumption had been confirmed during work on a report on thematic priority 1 (Global partnership in space exploration and innovation), which had witnessed attempts to include in the text not only questionable but also unacceptable arguments calling for the cementing of the leading role of the private sector in the formation of major aspects and the character of the future regulation of space activities. The delegation expressing that view was also of the view that the potential of private space activities should not be underestimated, and that while each State had the right to organize its private space activities in accordance with its own vision, it should do so in strict compliance with its responsibilities under the Outer Space Treaty.

41. The view was expressed that, while it was important to respect the need of some States to develop national legislation to enable an encouraging business environment for investors, domestic laws would remain limited in scope and would not replace an internationally agreed instrument that could be negotiated only within the framework of the Committee and its subcommittees: domestic legislation, despite its positive aspects, could not achieve what could only be realized by means of a multilateral instrument that catered to the interests of the international community.

42. Some delegations expressed the view that, given the impact of space activities on human life and the environment and the current state of technological advances, coupled with the increasingly prominent role played by new private actors, the Scientific and Technical Subcommittee and the Legal Subcommittee should enhance their interaction and coordination in a way that promoted the progressive development of international law and its codification and furthered the establishment of binding international norms governing issues critical to the use and exploration of outer space. The delegations expressing that view were also of the view that considerations under thematic priority 2 (Legal regime of outer space and global governance: current and future perspectives) could provide a good opportunity to enrich the work of the Committee in order to address the role of space in achieving the Sustainable Development Goals, contained in the 2030 Agenda for Sustainable Development.

43. The Subcommittee expressed its gratitude to the organizers of the following events, held on the margins of the current session of the Subcommittee:

(a) Side event organized by Oman and the Austrian Space Forum on the theme "AMADEE-18: international Mars analog research in the desert of Oman";

(b) Side event organized by the Russian Federation to screen the film *Salyut-7*;

(c) Side meeting organized by the Office for Outer Space Affairs on the theme "The global space partnership for the Sustainable Development Goals";

(d) Seminar organized by ESPI and the China National Space Administration (CNSA) on the theme "China engages: opportunities and prospects for the international space community";

(e) Seminar organized by ESPI on the theme "'Space2030' and 'space 4.0': synergies for capacity-building in the twenty-first century".

E. National reports

44. The Subcommittee took note with appreciation of the reports by Member States (A/AC.105/1154) and a conference room paper (A/AC.105/C.1/2018/CRP.8) submitted for its consideration under agenda item 4, entitled "General exchange of views and introduction of reports submitted on national activities". The

Subcommittee recommended that the Secretariat continue to invite Member States to submit annual reports on their space activities.

F. Symposium

45. In accordance with the agreement reached by the Subcommittee at its forty-fourth session, in 2007 (A/AC.105/890, annex I, para. 24), and at its fifty-fourth session, in 2017 (A/AC.105/1138, para. 289, and annex I, para. 26), a symposium organized by the Office for Outer Space Affairs on the topic "Expanding horizons: the case for industry engagement in UNISPACE+50 and beyond" was held on 6 February 2018.

46. The symposium, which consisted of presentations and discussions, was moderated by Simonetta Di Pippo, Director of the Office for Outer Space Affairs, who also served as a panellist. The other panellists were Johannes von Thadden, Senior Vice-President of Airbus Defence and Space; Donna Bethea-Murphy, Senior Vice-President of Global Regulatory at Inmarsat; Luciano Saccani, Senior Director of Business Development of the Sierra Nevada Corporation; Yao Jianting, Representative of the China National Academy of Space Technology; and Giovanni Rum, a consultant for the Office for Outer Space Affairs.

47. The Subcommittee noted with satisfaction that the symposium, the eleventh in a series of symposiums to strengthen partnerships with industry, had contributed to raising awareness with regard to the engagement by the Office with industry and the private sector. In that connection, the Subcommittee commended the Office for Outer Space Affairs on its excellent work.

G. Adoption of the report of the Scientific and Technical Subcommittee

48. After considering the items before it, the Subcommittee, at its 894th meeting, on 9 February 2018, adopted its report to the Committee on the Peaceful Uses of Outer Space, containing its views and recommendations, as set out in the paragraphs below.

II. United Nations Programme on Space Applications

49. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 5, entitled "United Nations Programme on Space Applications".

50. The representatives of China, Germany, Hungary, Indonesia, Italy, Japan, Mexico, Nigeria, Pakistan, the Russian Federation, Sri Lanka and the United Arab Emirates made statements under agenda item 5. A statement was also made under the item by the representative of Argentina on behalf of the Group of Latin American and Caribbean States. During the general exchange of views, statements relating to the item were made by representatives of other member States.

51. The Subcommittee heard a scientific and technical presentation entitled "Skolkovo Innovation Centre", by the representative of the Russian Federation.

A. Activities of the United Nations Programme on Space Applications

52. The Subcommittee recalled that the General Assembly, in its resolution 72/77, had recognized the capacity-building activities under the United Nations Programme on Space Applications, which provided unique benefits for Member States, in particular developing countries, participating in those activities.

53. The Subcommittee recalled that the United Nations Programme on Space Applications was one of the achievements of the first United Nations Conference on

the Exploration and Peaceful Uses of Outer Space (UNISPACE), and that both UNISPACE II (1982) and UNISPACE III (1999) had contributed to the development of the Programme's mandates. The Subcommittee noted with satisfaction that the Programme had played an instrumental role in assisting developing countries in acquiring knowledge, skills and practical experience for the application of space technology for the purpose of economic, social and cultural development. The Subcommittee also noted that UNISPACE+50 could provide a great opportunity to identify the needs of developing countries that could be addressed by the Office for Outer Space Affairs through international cooperation.

54. At the 875th meeting, on 29 January, the Director of the Office for Outer Space Affairs, following the request made by the General Assembly in its resolution 72/77, apprised the Subcommittee of the status of the Office's activities under the United Nations Programme on Space Applications. She also informed the Subcommittee that, as part of the Office's responsibilities to implement important and complex plans, activities and initiatives under the UNISPACE+50 process, the Office was continuing to undertake a broad range of important measures aimed at accommodating the strategic developments in its capacity-building programme of work, including its Programme on Space Applications. Through that Programme, the Office could deliver much more capacity-building that was focused on the needs of developing countries and global problems of humanity while involving more cross-cutting and topical issues and a wider circle of qualified experts, thereby enabling the delivery of capacity-building efforts at levels corresponding to the highest current standards and in accordance with the expectations of Member States.

55. The Subcommittee noted with appreciation that, since its previous session, in-cash and in-kind contributions, including the provision of staff on a non-reimbursable loan basis, had been offered for the activities of the Office, including the United Nations Programme on Space Applications, by the following: Austrian Research Promotion Agency (FFG); Institute for Scientific Research of Boston College (United States); China Manned Space Agency; CNSA; Delta State University (United States); Department of Science and Technology, Government of South Africa; DigitalGlobe; Federal University of Santa Maria (Brazil); European Commission; ESA; German Aerospace Centre (DLR); Federal Ministry for Economic Affairs and Energy of Germany; Government of China; Agustin Codazzi National Geographical Institute, Government of Colombia; Government of Germany; Government of Japan; Government of Switzerland; Government of the United Arab Emirates; Government of the United States; Centre for Space Science and Technology Education in Asia and the Pacific; Japan Aerospace Exploration Agency (JAXA); Joanneum Research Forschungsgesellschaft mbH (Austria); Kyushu Institute of Technology (Japan); National Oceanic and Atmospheric Administration (United States); National Disaster Reduction Centre of China; People's Insurance Company of China; Politecnico di Torino, Instituto Superiore Mario Boella and Instituto Nazionale di Ricerca Metrologica (Italy); PSIPW, King Saud University (Saudi Arabia); Samara University (Russian Federation); Stellenbosch University (South Africa); Scientific and Technological Research Council of Turkey (TÜBITAK); Office for the Coordination of Humanitarian Affairs of the Secretariat; Mohammed Bin Rashid Space Centre (United Arab Emirates); University of Bonn (Germany); University of Geneva (Switzerland); University of Vienna, National Point of Contact Space Law and University of Salzburg (Austria); WHO; and World Vision.

56. The Subcommittee also noted that, since its last session, in 2017, the Office had concluded memorandums of understanding, funding agreements and framework agreements in the framework of its capacity-building activities, including the implementation of the United Nations Programme on Space Applications. The Office had also extended agreements, where appropriate, with the Governments of Austria, Italy, Switzerland and the United States; the Bureau of Oceans and International Environmental and Scientific Affairs of the Department of State of the United States; the Italian Space Agency (ASI); the United Arab Emirates Space Agency; the United Nations Development Programme; the United Nations Institute for Training

and Research; the University of Bonn (Germany); WSWA; Paz y Cooperación; and the private sector entities DigitalGlobe (United States) and the People's Insurance Company of China.

57. The Subcommittee further noted that the Government of Japan, through the Kyushu Institute of Technology, and the Politecnico di Torino and Instituto Superiore Mario Boella, in collaboration with the Istituto Nazionale di Ricerca Metrologica, had continued to provide long-term fellowship programme opportunities for students from developing countries under the United Nations/Japan Long-term Fellowship Programme on Nanosatellite Technologies, and the United Nations/Italy Long-term Fellowship Programme on Global Navigation Satellite Systems and Related Applications, respectively.

58. The Subcommittee noted the Drop Tower Experiment Series, which was a fellowship programme of the Office for Outer Space Affairs, undertaken in collaboration with the Center of Applied Space Technology and Microgravity and DLR, in which students could study microgravity by performing experiments in a drop tower. In the fourth cycle of the fellowship programme, a team from the Warsaw University of Technology had been awarded the fellowship through competitive selection. A new, fifth cycle was under way.

59. The Subcommittee also noted the continued collaboration between the Office for Outer Space Affairs and the Government of Japan, in collaboration with JAXA, in implementing the United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station Japanese Experiment Module (Kibo), known as "KiboCUBE". The programme had been launched in September 2015. After the selection of the team from the University of Nairobi for the first round, a team from the Universidad del Valle of Guatemala had been selected for the second round; applications for the third round, to be held in 2018 and 2019, were currently open. The objective of the Cooperation Programme was to promote international cooperation and capacity-building in space technology and its applications under the Human Space Technology Initiative by providing opportunities for educational and research institutions in developing countries to deploy small satellites (CubeSats) from the Japanese Experiment Module (Kibo).

60. The Subcommittee continued to express its concern over the still-limited financial resources available for carrying out the capacity-building activities of the Office, including the United Nations Programme on Space Applications, and appealed to Member States to provide support through voluntary contributions.

61. The Subcommittee noted that the priority areas of the Programme were environmental monitoring, natural resource management, satellite communications for tele-education and telemedicine applications, disaster risk reduction, the use of global navigation satellite systems (GNSS), the Basic Space Science Initiative, climate change, the Basic Space Technology Initiative and the Human Space Technology Initiative, and biodiversity and ecosystems.

62. The Subcommittee also noted that the Programme was aimed at promoting, through international cooperation, the use of space technologies and space-related data for sustainable economic and social development in developing countries by establishing or strengthening capacity in developing countries to use space technology; raising the awareness of decision makers of the cost-effectiveness and additional benefits to be obtained from such technologies and data; and strengthening outreach activities to disseminate awareness of those benefits.

63. The Subcommittee further noted the following activities under the Programme on Space Applications, conducted by the Office in 2017, together with Member States and other international organizations:

(a) Expert meeting on preparations for the United Nations/Italy Workshop on the Open Universe Initiative held in Rome on 11 and 12 April 2017 (A/AC.105/2017/CRP.22);

(b) Office for Outer Space Affairs and Committee on Space Research coordination meeting in support of the preparations for UNISPACE+50, held in Vienna on 22 and 23 May 2017 (A/AC.105/2017/CRP.25);

(c) Meeting of the Directors of the regional centres for space science and technology education, affiliated to the United Nations, held in Vienna on 13 and 14 June 2017;

(d) United Nations/United States of America Workshop on the International Space Weather Initiative: the decade after the International Heliophysical Year 2007, held in Boston, United States, from 31 July to 4 August 2017 (A/AC.105/1160);

(e) United Nations/World Health Organization/Switzerland Conference on Strengthening Space Cooperation for Global Health, held in Geneva from 23 to 25 August 2017, with the financial support of the Government of Switzerland (A/AC.105/1161);

(f) United Nations/Austria Symposium on the theme "Access to space: holistic capacity-building for the twenty-first century", held in Graz, Austria, from 3 to 7 September 2017 (A/AC.105/1162);

(g) United Nations/Russian Federation Workshop on Human Capacity-building in Space Science and Technology for Sustainable Social and Economic Development, held in Samara, Russian Federation, from 30 October to 2 November 2017 (A/AC.105/1164);

(h) United Nations/Italy Workshop on the Open Universe initiative, held in Vienna from 20 to 22 November 2017 (A/AC.105/1175);

(i) United Nations/South Africa Symposium on Basic Space Technology on the theme "Small satellite missions for scientific and technological advancement", held in Stellenbosch, South Africa, from 11 to 15 December 2017. The report on the Symposium was made available in conference room paper A/AC.105/C.1/2018/CRP.9, and would also be made available in document A/AC.105/1180).

64. The Subcommittee was informed that the Office for Outer Space Affairs had organized, and was continuing to organize, capacity-building events, including within the Programme on Space Applications, with the Governments of Argentina, Austria, Brazil, Chile, Germany, Italy, Pakistan and the United States. The Subcommittee was also informed that those events had been planned to cover the following topics: GNSS, space applications for water management, space weather, basic space technology, human space technology, capacity-building in space technology and applications, disaster risk reduction and emergency response. The Subcommittee noted that the Office would provide reports and information on the events at its fifty-sixth session, in 2019.

65. The Subcommittee noted that, in addition to the United Nations conferences, training courses, workshops, seminars and symposiums conducted in 2017 and planned for 2018, the Office for Outer Space Affairs had conducted, and planned to conduct, other activities under the Programme, placing emphasis on the following:

(a) Providing support for capacity-building efforts in developing countries through the regional centres for space science and technology education, affiliated to the United Nations;

(b) Strengthening its long-term fellowship programme, to include support for the implementation of pilot projects;

(c) Ensuring the mainstreaming of the gender perspective into all of its activities;

(d) Promoting the participation of young people in space activities;

(e) Supporting or initiating pilot projects as a follow-up to activities of the Programme in areas of priority interest to Member States;

(f) Providing technical advice, upon request, to Member States, bodies and specialized agencies of the United Nations system and relevant national and international organizations;

(g) Enhancing access to space-related data and other information;

(h) Applying an integrated and cross-sectoral approach to activities, as appropriate.

66. The Subcommittee also noted the highlights of the activities of the regional centres for space science and technology education, affiliated to the United Nations, namely the African Regional Centre for Space Science and Technology Education — in English Language; the African Regional Centre for Space Science and Technology — in French Language; the Centre for Space Science and Technology Education in Asia and the Pacific; the Regional Centre for Space Science and Technology Education for Latin America and the Caribbean; the Regional Centre for Space Science and Technology Education for Western Asia; and the Regional Centre for Space Science and Technology Education in Asia and the Pacific (China).

67. The Subcommittee further noted that, on the margins of its current session, a teleconference had been held between representatives of the Office for Outer Space Affairs and representatives of all the regional centres for space science and technology education, affiliated to the United Nations, at which the parties had discussed the status of current cooperation, as well as modalities and directions of future work in the field of capacity-building, taking into account the UNISPACE+50 process.

68. The Subcommittee noted the request made by the Group of Latin American and Caribbean States that the Committee and its subcommittees should strengthen cooperation with regional organizations and institutions, such as the Regional Centre for Space Science and Technology Education for Latin America and the Caribbean, the Space Conference of the Americas and the Society of Latin American Experts in Remote Sensing and Space Information Systems (SELPER), and that the Office for Outer Space Affairs should support cooperation with such organizations through its activities and events.

69. Some delegations expressed the view that the United Nations had to continue to actively promote its role in the cooperation between developing and developed countries, as well as among developing countries, in order to strengthen the infrastructure and technology of the space sector, especially through capacity-building, information-sharing and technology transfer, which could accelerate development in various aspects of life. The delegations expressing that view were also of the view that it was important to promote collaboration between developing and developed countries in order to ensure equitable access to space science and technology.

B. Regional and interregional cooperation

70. The Subcommittee recalled that the General Assembly, in its resolution 72/77, had emphasized that regional and interregional cooperation in the field of space activities was essential to strengthen the peaceful uses of outer space, assist Member States in the development of their space capabilities and contribute to the implementation of the 2030 Agenda for Sustainable Development. To that end, the Assembly had requested relevant regional organizations and their groups of experts to offer the assistance necessary for countries to carry out the recommendations of regional conferences. In that regard, the Assembly had noted the importance of the equal participation of women in all fields of science and technology.

71. The Subcommittee noted that the Government of Nigeria would be hosting the seventh African Leadership Conference on Space Science and Technology for Sustainable Development, which was to be held in Abuja from 5 to 9 November 2018.

72. The Subcommittee also noted that the Government of the Bolivarian Republic of Venezuela and the Bolivarian Agency for Space Activities had hosted the second Venezuelan conference on space technology, which had been held in Caracas from 18 to 20 September 2017.

73. The Subcommittee further noted that the twenty-fourth session of the Asia-Pacific Regional Space Agency Forum, on the theme of space technology for enhanced governance and development, had been held in Bangalore, India, from 14 to 17 November 2017. The twenty-fifth session would be held in Singapore in November 2018.

74. The Subcommittee noted that the eleventh meeting of the Council of APSCO, hosted by the Government of the Islamic Republic of Iran and organized by the Iranian Space Agency, had been held in Tehran from 11 to 14 September 2017.

75. The Subcommittee was informed about the preliminary interest of the United Arab Emirates in establishing, in affiliation with the Office for Outer Space Affairs, a centre of excellence for safety in space environment and activities, subject to concluding discussions with the Office on the scope and associated agreement terms.

III. Space technology for sustainable socioeconomic development

76. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 6, entitled "Space technology for sustainable socioeconomic development".

77. The representatives of Belgium, Burkina Faso, China, Egypt, Germany, Indonesia, Italy, Japan, Jordan, Pakistan and the United Arab Emirates made statements under agenda item 6. A statement was also made under the item by the representative of Argentina on behalf of the Group of Latin American and Caribbean States. The observer for WMO also made a statement. During the general exchange of views, statements relating to the item were made by representatives of other member States.

78. The Subcommittee heard the following scientific and technical presentations:

(a) "Open Universe initiative: progress report", by the representative of Italy;

(b) "Fast and direct access to space for research, technology, education and capacity-building through ICE Cubes commercial service", by the representative of Belgium;

(c) "IAFconnect.org: innovative space business platform as a contribution to the 2030 Agenda for Sustainable Development implementation", by the representative of Ukraine.

79. The Subcommittee had before it the following:

(a) Report on the United Nations Expert Meeting on Space for Women held in New York from 4 to 6 October 2017 (A/AC.105/1163);

(b) Report on the United Nations/United Arab Emirates High-level Forum on Space as a Driver for Socioeconomic Sustainable Development held in Dubai, United Arab Emirates, from 6 to 9 November 2017 (A/AC.105/1165);

(c) Note by the Secretariat on the "Space2030" agenda and the global governance of outer space activities (A/AC.105/1166);

(d) Note by the Secretariat on UNISPACE+50 thematic priority 1 (Global partnership in space exploration and innovation) (A/AC.105/C.1/114);

(e) Note by the Secretariat on UNISPACE+50 thematic priority 2 (Legal regime of outer space and global governance: current and future perspectives) (A/AC.105/1169);

(f) Note by the Secretariat on UNISPACE+50 thematic priority 3 (Enhanced information exchange on space objects and events) (A/AC.105/1170);

(g) Note by the Secretariat on UNISPACE+50 thematic priority 4 (International framework for space weather services) (A/AC.105/1171);

(h) Note by the Secretariat on UNISPACE+50 thematic priority 5 (Strengthened space cooperation for global health) (A/AC.105/1172);

(i) Note by the Secretariat on UNISPACE+50 thematic priority 6 (International cooperation towards low-emission and resilient societies) (A/AC.105/1173);

(j) Note by the Secretariat on UNISPACE+50 thematic priority 7 (Capacity-building for the twenty-first century) (A/AC.105/1174);

(k) Note by the Secretariat containing the preliminary text of the draft resolution on space as a driver of sustainable development (A/AC.105/C.1/L.364);

(l) Procedural note on UNISPACE+50 thematic priority 1 (A/AC.105/C.1/2018/CRP.3);

(m) Conference room paper containing revisions to the draft resolution on space as a driver of sustainable development (A/AC.105/C.1/2018/CRP.6);

(n) Conference room paper containing further revisions to the draft resolution on space as a driver of sustainable development (A/AC.105/C.1/2018/CRP.16 and Rev.1);

(o) Conference room paper entitled "Capacity-building network: description and road map" (A/AC.105/C.1/2018/CRP.12);

(p) Conference room paper on the global compact for space (A/AC.105/C.1/2018/CRP.15).

80. The Subcommittee recalled the preamble of General Assembly resolution 72/77 and noted in that context that the use of space science and technology and their applications in areas such as tele-health, tele-education, disaster management, environmental protection, natural resources management and ocean and climate monitoring contributed to achieving the objectives of the global conferences of the United Nations that addressed various aspects of economic, social and cultural development, in particular poverty eradication.

81. The Subcommittee noted that UNISPACE+50 represented an important opportunity to highlight and strengthen the role of space as a driver for socioeconomic sustainable development and the role of space in delivering on the 2030 Agenda, as well as the fundamental role of the Committee on the Peaceful Uses of Outer Space in the governance of outer space activities.

82. The Subcommittee expressed its gratitude for the efforts of the Office for Outer Space Affairs in assisting the Committee, its subcommittees and member States with regard to the preparations for the UNISPACE+50 process.

83. The Subcommittee noted that the second High-level Forum on Space as a Driver for Socioeconomic Sustainable Development had been held in Dubai, United Arab Emirates, from 6 to 9 November 2017. It had been organized by the Office for Outer Space Affairs in collaboration with the Government of the United Arab Emirates as part of the preparations for UNISPACE+50 and with the aim of advancing the debate on the role of space science and technology in fostering global development.

84. The Subcommittee noted with appreciation that the third High-level Forum on Space as a Driver for Socioeconomic Sustainable Development would be held in Bonn, Germany, from 13 to 16 November 2018.

85. Some delegations welcomed initiatives under UNISPACE+50 that added value and could lead to the improved utilization of space-based data for sustainable development, such as the establishment of the Space Climate Observatory, as

proposed in the declaration entitled "Towards a space climate observatory", adopted at the One Planet Summit held in Paris on 11 December 2017.

86. The view was expressed that the Space Climate Observatory initiative should be coordinated closely with the existing Global Climate Observing System to ensure optimal synergy and efficiency.

87. The Subcommittee welcomed the work undertaken by the Action Team on Exploration and Innovation, established as the mechanism of UNISPACE+50 thematic priority 1, and, in that connection, took note of document A/AC.105/C.1/114 and conference room paper A/AC.105/C.1/2018/CRP.3, which provided an update on the Action Team's work.

88. The Subcommittee noted that the Action Team had met on the margins of the present session and that, in line with the Action Team's terms of reference (A/AC.105/2017/CRP.21, annex I), the outcome of the second International Space Exploration Forum, to be held in Tokyo on 3 March 2018, would be added to the report on thematic priority 1. The Subcommittee also noted that the updated document would be before delegations at the sixty-first session of the Committee in 2018 as document A/AC.105/1168.

89. The view was expressed that document A/AC.105/1170 did not contain a faithful account of the work of the Committee under thematic priority 3 of UNISPACE+50. In particular, the initiatives and documents presented over the previous few years by member States and groups of member States pertaining to space objects and events (for example, A/AC.105/L.302, A/AC.105/C.1/L.361 and A/AC.105/2017/CRP.27) had not been mentioned in A/AC.105/1170, although those initiatives had been at the origin of the discussions on the subject selected as thematic priority 3.

90. The Subcommittee noted with satisfaction the work by the Office on the "Space for women" initiative, which was aimed at promoting the empowerment of women and achieving gender equality in the space sector through targeted capacity-building and technical advisory activities to encourage the involvement of women and girls in science, technology, engineering and mathematics education.

91. The view was expressed that developed countries should share space technology at a faster pace in order to enhance the capacity of developing nations.

92. The view was expressed that the direct transfer of technologies, skills and support materials, with a view to facilitating the development and use of space technology, would contribute to the attainment of objectives set out in the 2030 Agenda for Sustainable Development.

93. The view was expressed that enhancing access to space, in particular for developing countries, required capacity-building programmes such as the proposed establishment, in Malindi, Kenya, of an international centre for space education in Africa, in line with the objectives of the capacity-building network described in conference room paper A/AC.105/C.1/2018/CRP.12.

94. The Subcommittee noted the crucial role of space data and technology in supporting decision-making and improved care, education and early warning measures in the public and global health domains and reaffirmed the importance of the work of its Expert Group on Space and Global Health.

95. The Subcommittee noted with satisfaction that China would hold a training session on the theme "Space cooperation for global health" from 12 to 26 April 2018, with a view to facilitating the use of space technology in global heath.

96. The Working Group of the Whole was reconvened with Mylswamy Annadurai (India) as Chair, in accordance with paragraph 9 of General Assembly resolution 72/77. At its 894th meeting, on 9 February, the Subcommittee endorsed the report of the Working Group of the Whole, which is contained in annex I to the present report.

IV. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment

97. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 7, entitled "Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment".

98. The representatives of China, Egypt, India, Indonesia, Israel, Japan, Kazakhstan, Oman, Pakistan, the Russian Federation, Sri Lanka, South Africa and the United States made statements under agenda item 7. The observer for PSIPW also made a statement under the agenda item. During the general exchange of views, some statements relating to the item were also made by representatives of other member States.

99. The Subcommittee heard the following scientific and technical presentations:

(a) "Worldwide engagement for greenhouse gas emission monitoring from space", by the representative of Japan;

(b) "Summary of the United States National Academy of Sciences 2017–2027 'decadal survey' for Earth science and applications from space", by the representative of the United States;

(c) "Creation and integration: introduction to the visualization platform of CHEOS and application", by the representative of China;

(d) "Development of the Russian national Earth remote sensing system", by the representative of the Russian Federation.

100. In the course of the discussions, delegations reviewed national, bilateral, regional and international programmes on remote sensing, in particular in the following areas: air and water quality monitoring for aerosols and pollutants; monitoring of atmospheric processes; climate change, including essential climate variables monitoring; disaster management and vulnerability assessments; ozone loss; natural resource management; ecosystems management; forestry; hydrology; meteorology and severe weather forecasting; land use and land cover change monitoring; sea surface temperature and wind monitoring; environmental change; greenhouse gas monitoring and inventory; glacier mapping and studies; crop and soil monitoring; irrigation; precision agriculture; groundwater detection; space weather; health impacts; security; law enforcement; mineral mapping; and urban development.

101. The Subcommittee noted that the use of remote sensing technology, including hyperspectral remote sensing, and its applications had significantly improved the way in which people lived and worked. Remote sensing technologies had proved to be valuable tools for the collection of observation data, global monitoring and informed decision-making at all levels.

102. The Subcommittee also noted the continued interest of member States in cooperating internationally in the collection, processing and dissemination of Earth observation data and applications, in particular to strengthen the capacities of developing countries and to promote well-informed decisions. In that regard, the Subcommittee noted the availability and increased regional presence of numerous Earth observation data and application service providers, such as the Regional Visualization and Monitoring System (SERVIR), and of dedicated national remote sensing laboratories, which offered opportunities for national and local decision makers to utilize satellite-derived information in different domains.

103. The Subcommittee further noted that the development of applications based on remote sensing greatly contributed to the achievement of the 2030 Agenda for Sustainable Development and also, in particular, to addressing the triple challenges of poverty, inequality and unemployment in Africa.

104. The Subcommittee noted the efforts of developing countries to: (a) improve the use of Earth observation data, including through the development and operation of national remote sensing satellites; (b) build national capacity to reduce poverty; (c) advance socioeconomic development through the rational and sustainable use of resources; and (d) improve the quality of life of their populations. Some delegations expressed the view that the increasing number of workshops and training opportunities offered in that domain was beneficial.

105. The Subcommittee noted with appreciation the development of knowledge platforms, online imagery access services and online mapping and visualization platforms for remotely sensed data that enabled the better utilization of and improved access to such data resources.

106. The Subcommittee noted the important role played by the Group on Earth Observations (GEO) and the Committee on Earth Observation Satellites (CEOS) and its working groups in improving the sharing of remote sensing data and worldwide access to data, and also noted the strong commitment of member States to supporting those initiatives.

107. The Subcommittee also noted the cooperation between the Office for Outer Space Affairs and PSIPW with regard to the advancement of space science and technology to address the growing problem of water scarcity around the globe. It further noted the planned launch of a space and water knowledge portal to highlight the benefits of remote sensing technology in water management.

108. The Subcommittee further noted that the Brazilian Space Agency, the State Space Corporation "Roscosmos" of the Russian Federation, the Indian Space Research Organization, CNSA and the South African National Space Agency were jointly establishing the BRICS Remote Sensing Satellite Constellation as a new mechanism to enhance cooperation for the sharing and exchange of remote sensing data to meet the current and future challenges of sustainable development. The Subcommittee noted that that cooperation would also deepen space cooperation and allow enhanced collaboration with the Office for Outer Space Affairs and other international space organizations.

109. The view was expressed that the use of satellite-derived remote sensing data and related technology tools was largely inequitable owing to the lack in some countries of adequate ground station infrastructure and infrastructure for receiving and distributing data, thereby limiting the socioeconomic benefits that could be derived from their use.

110. The Subcommittee noted the continued support for the activities of CEOS and that the European Commission was serving as Chair of CEOS for 2018. The Subcommittee also noted that the thirty-second plenary session of CEOS would be held in Brussels from 16 to 18 October 2018.

111. The Subcommittee also noted the continued support for the activities of GEO. It further noted that the next GEO executive committee meeting would be held in Geneva in March 2018 and that the next GEO plenary meeting would be held in Kyoto, Japan, in October 2018.

V. Space debris

112. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 8, entitled "Space debris".

113. The representatives of Canada, Chile, China, Egypt, Germany, India, Indonesia, Japan, Mexico, Pakistan, the Russian Federation, Slovakia, Ukraine, the United Arab Emirates, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 8. A statement was made under the item by the representative of Argentina on behalf of the Group of Latin American and Caribbean

States. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

114. The Subcommittee heard the following scientific and technical presentations:

(a) "Overview of the annual activities of the Inter-Agency Space Debris Coordination Committee", by the representative of Japan;

(b) "United States space debris environment, operations and research updates", by the representative of the United States;

(c) "Space debris mitigation activities at ESA in 2017", by the observer for ESA;

(d) "Technical proposals for space debris remediation (including the International Space Station as testbed platform)", by the observer for the National Space Society.

115. The Subcommittee had before it information on national research on space debris, the safety of space objects with nuclear power sources on board and problems relating to the collision of such objects with space debris, in replies received from Member States and international organizations (A/AC.105/C.1/113 and A/AC.105/C.1/2018/CRP.10).

116. The Subcommittee noted with satisfaction that the endorsement by the General Assembly, in its resolution 62/217, of the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space had proved vital in controlling the space debris problem for the safety of future space missions.

117. The Subcommittee also noted with satisfaction that many States and international intergovernmental organizations were implementing space debris mitigation measures consistent with the Space Debris Mitigation Guidelines of the Committee and/or the Space Debris Mitigation Guidelines of the Inter-Agency Space Debris Coordination Committee and that a number of States had harmonized their national space debris mitigation standards with those guidelines.

118. The Subcommittee noted that some States were using the Space Debris Mitigation Guidelines of the Committee, the European Code of Conduct for Space Debris Mitigation, International Organization for Standardization standard 24113:2011 (Space systems: space debris mitigation requirements) and ITU recommendation ITU-R S.1003 (Environmental protection of the geostationary-satellite orbit) as reference points in their regulatory frameworks for national space activities.

119. The Subcommittee also noted that, in the area of space debris, some States were cooperating under the space surveillance and tracking support framework funded by the European Union and in the ESA space situational awareness programme.

120. The Subcommittee expressed concern at the increasing amount of space debris and encouraged States as well as agencies, industries and academic institutions that had not yet done so to consider voluntarily implementing the Space Debris Mitigation Guidelines of the Committee.

121. The Subcommittee noted that the Inter-Agency Space Debris Coordination Committee, whose initial work had served as the basis for the Space Debris Mitigation Guidelines of the Committee, continued its work to characterize the space debris environment and evaluate improvements to its own Space Debris Mitigation Guidelines.

122. The Subcommittee noted with appreciation that States had undertaken a number of concrete actions to mitigate space debris, including the improvement of the design of launch vehicles and spacecraft, the development of specific software, the reorbiting of satellites, passivation, life extension, end-of-life operations and disposal. The Subcommittee noted the evolving technologies related to the in-orbit robotic servicing of satellites, the extension of satellite lifespans and active space debris removal.

123. The Subcommittee noted the development and application of new technologies and ongoing research related to space debris mitigation; collision avoidance; protecting space systems from space debris; limiting the creation of additional space debris; re-entry and collision avoidance techniques; measuring, characterizing, continuous monitoring and modelling of space debris; prediction, early warning and notification of space debris re-entry and collision; and space debris orbit evolution and fragmentation.

124. Some delegations expressed the view that space debris issues should be addressed in a manner that would neither impose an undue burden on the space programmes of developing nations nor jeopardize the development of the space capabilities of those States.

125. Some delegations expressed the view that countries with advanced space programmes should assume their responsibilities for space debris mitigation and removal to ensure that the mitigation and removal costs were not passed on to countries with emerging space capabilities.

126. Some delegations expressed the view that it was important for States with developed space programmes to comply with their responsibilities to provide complete and timely information and to prevent the creation of space debris, mitigate and remove space debris appropriately and provide special assistance measures to those countries with incipient or non-existent space programmes that could potentially be affected by space debris.

127. The view was expressed that, as space debris had been created by the earlier operations of spacefaring nations, those nations had a responsibility and an obligation to assist others in the full implementation of space debris mitigation guidelines.

128. The view was expressed that, in addressing space debris issues, States should act in line with the principle of common but differentiated responsibilities, which was based on the recognition of historical differences in the contributions of developed and developing States to the creation of space debris and the acknowledgement of differences in States' economic and technical capacities.

129. The view was expressed that all States carrying out outer space activities should act in a responsible manner in order to maintain the safety and the sustainability of such activities.

130. The view was expressed that all issues related to space debris needed to be considered thoroughly, taking into account the concerns and interests of all States, and be agreed by consensus.

131. Some delegations expressed the view that the Safety Framework for Nuclear Power Source Applications in Outer Space and the Space Debris Mitigation Guidelines of the Committee were documents that could enrich the activities of the Legal Subcommittee and the work of the Committee in promoting the safety and sustainability of activities in outer space.

132. The view was expressed that cooperation between the Scientific and Technical Subcommittee and the Legal Subcommittee should result in the development of legally binding rules for the handling of space debris.

133. The view was expressed that the Space Debris Mitigation Guidelines of the Committee should incorporate the results and good practices consolidated by the Working Group on the Long-term Sustainability of Outer Space Activities that related to space debris, with a view to developing a new set of United Nations principles on space debris mitigation.

134. Some delegations expressed concern that developments in the field of small satellites and the emergence of large satellite constellations heightened the risk of further growth in the amount of space debris and increased the risk of collision.

135. The view was expressed that States should develop innovative technologies and sensing capabilities to improve the global space situational awareness of space debris objects.

136. The view was expressed that, in order to stop the increasing concentration of debris, it was necessary to make sure that every new satellite and launch vehicle was properly and effectively removed at the end of its life, and that future strategies could include removing, recycling and reusing defunct satellites in outer space.

137. The view was expressed that, prior to undertaking any active space debris disposal activities, it was important to ensure the following: (a) the full implementation of transparency and confidence-building measures; (b) the involvement of all stakeholders, either directly or through the Secretary-General; and (c) the fulfilment of procedures such as licensing, export control and insurance, as stipulated in the legislation of participating States.

138. The view was expressed that it was important for the international community to work together to identify and reduce the barriers and risks relating to feasible orbital debris removal missions, and that increased international understanding on the appropriate framework for those missions would be essential for the effective use of outer space.

139. The view was expressed that the criteria and procedures for active removal or intentional destruction of space objects needed to be thoroughly deliberated upon under the auspices of the United Nations to ensure acceptability by stakeholders.

140. Some delegations expressed satisfaction with the increasing levels of technical cooperation and voluntary data-sharing, which were important for effective and efficient monitoring of space debris and for the implementation of mitigation measures to contain the threats posed by space debris.

141. The view was expressed that cooperation between spacefaring countries and countries with emerging space capabilities needed to be strengthened in order to accommodate the transfer of knowledge, the improvement of capacity and the sharing of data, information and analysis methods.

142. The view was expressed that data on all natural and launched space objects in near-Earth orbit should be shared so that States and international organizations could perform conjunction assessments for their in-orbit space objects, and that a centre for monitoring near-Earth space under the auspices of the United Nations could be established.

143. Some delegations expressed the view that it was essential for all information related to the entry of space debris into the atmosphere to be communicated with diligence and promptness to those countries that might be affected and that cooperation mechanisms should be intensified to enable necessary measures to prevent and mitigate damage to property and persons.

144. Some delegations expressed the view that information related to the entry of space debris into the atmosphere should cover the tracks and re-entry potential of that debris, the probability of re-entry in a particular area or country, the potential damage if the debris fell outside the predicted area, the prediction method employed and the supporting data used.

145. The Subcommittee noted with satisfaction that the compendium of standards adopted by States and international organizations to mitigate the creation of space debris, which had been initiated by Canada, Czechia and Germany, was being continuously updated and could be consulted on the website of the Office for Outer Space Affairs. The Subcommittee encouraged Member States to provide contributions and updates to the compendium.

146. The Subcommittee took note of paragraph 12 of General Assembly resolution 72/77 and agreed that Member States and international organizations having permanent observer status with the Committee should continue to be invited

to provide reports on research on space debris, the safety of space objects with nuclear power sources on board, problems relating to the collision of such space objects with space debris and the ways in which debris mitigation guidelines were being implemented.

VI. Space-system-based disaster management support

147. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 9, entitled "Space-system-based disaster management support".

148. The representatives of Argentina, Canada, China, Egypt, France, Germany, India, Indonesia, Israel, Japan, Mexico, Pakistan, the Republic of Korea, the Russian Federation, Saudi Arabia, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 9. A statement was also made under the item by the representative of Argentina on behalf of the Group of Latin American and Caribbean States. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

149. The Subcommittee heard the following scientific and technical presentations:

(a) "Space-based technology for disaster risk reduction in China: from policy to practice", by a representative of China;

(b) "Global satellite system for monitoring and forecasting Earth seismic activity", by a representative of Ukraine.

150. The Subcommittee had before it the following:

(a) Report on the United Nations International Conference on Space-based Technologies for Disaster Risk Reduction on the theme "Building resilience through integrated applications", held in Beijing from 23 to 25 October 2017 (A/AC.105/1156);

(b) Report on activities carried out in 2017 in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (A/AC.105/1157);

(c) Report on the United Nations/Germany International Conference on International Cooperation towards Low-Emission and Resilient Societies, held in Bonn, Germany, from 22 to 24 November 2017 (A/AC.105/1181).

151. The Subcommittee noted with satisfaction the progress made with regard to activities held in 2017 in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), including the continuing advisory support and other support provided through it for emergency response efforts.

152. Some delegations reiterated the importance of intensifying coordination and international cooperation as a way of carrying out capacity-building programmes in Latin America and the Caribbean.

153. The Subcommittee noted that, with the continued support of its network of partners, UN-SPIDER had carried out a technical advisory mission to Nepal, as well as follow-up activities in El Salvador, Guatemala, Myanmar, Solomon Islands and Sri Lanka. The Subcommittee noted with satisfaction the capacity-building efforts in the form of training sessions that had been held in China, El Salvador, Guatemala and Sri Lanka, addressing specific requirements and providing follow-up to the UN-SPIDER technical advisory missions carried out in previous years.

154. The Subcommittee also noted the synergies and cross-border actions facilitated by UN-SPIDER. It further noted other capacity-building sessions that were planned

and emphasized the need for increased capacity-building support in the various regions.

155. The Subcommittee welcomed the planned outreach activities of the Office for Outer Space Affairs, represented by UN-SPIDER, and its developing partnerships with United Nations entities, international organizations and Member States to continue promoting the use of space-based tools and information in global and regional initiatives, such as under the Sendai Framework for Disaster Risk Reduction 2015–2030, the 2030 Agenda for Sustainable Development and the Paris Agreement.

156. The Subcommittee noted with satisfaction the ongoing activities of States members of the Committee to increase the availability and use of space-based solutions in support of disaster risk reduction. Those activities included promoting emergency observation and cartography in the event of natural or technological disasters under the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters, and under the Sentinel Asia programme and SERVIR Himalaya, which covered countries in Asia.

157. The Subcommittee also noted with satisfaction the efforts conducted by Member States under the Charter and Sentinel Asia to support disaster response efforts. The Charter had been activated 44 times in 2017, to support 29 countries; on two occasions it had been activated to support several Caribbean States through one activation. Sentinel Asia had been activated 35 times in 2017, for 12 countries. In addition, the Subcommittee noted that Myanmar and Sri Lanka had recently been accepted as authorized users of the Charter and that Costa Rica and Paraguay had also applied.

158. The Subcommittee further noted with satisfaction the activities conducted by several member States, directly or through the Charter or Sentinel Asia, to facilitate access to satellite imagery and space-based information to support disaster response efforts following cyclones in the southern Indian Ocean, hurricanes in the Caribbean, tropical storms in the Philippines, earthquakes in China, Mexico, the Republic of Korea and Saudi Arabia, floods and landslides in Bangladesh, China, Colombia, Canada, Guatemala, Haiti, Honduras, India, Nepal, Peru, the Philippines, Saudi Arabia, Thailand and Viet Nam, and in southern Africa, forest fires in Argentina, the Russian Federation and the United States, and volcanic activity in Indonesia.

159. The Subcommittee noted with satisfaction other activities of member States in the same area, such as the promotion, with the support of UN-SPIDER, of the universal access initiative of the Charter and the provision of national and regional data portals for the dissemination of information in near-real time. The Subcommittee noted the efforts of several member States through CEOS, in particular in the context of its Working Group on Disasters and its Recovery Observatory. The aim of the Recovery Observatory, a complementary mechanism to the Charter, was to contribute to reconstruction efforts in countries under the principle of "Build back better", as stipulated in the Sendai Framework.

160. The Subcommittee noted the relevance of online platforms for sharing and disseminating space-based data and information to monitor the impacts and evolution of natural disasters and for providing decision makers and stakeholders with access to such data quickly and easily. Member States incorporating such platforms included China, India, Indonesia, the Russian Federation and the United States.

161. Some delegations commented on their countries' efforts to integrate satellite data into early warning systems addressing floods, sand and desert storms and forest fires.

162. Some delegations noted the usefulness of the extension of the COCONet (Continuously Operating Caribbean Global Positioning System Observational Network) project, which had been launched in 2016 to contribute to an improved understanding of seismic hazards.

163. The view was expressed that it was necessary to recognize that climate change was causing sea levels to rise and was exacerbating the impacts of storm surges and

floods. The delegation expressing that view also expressed the view that the impacts of rising sea levels would manifest themselves in coastal cities worldwide and that coastal communities and their livelihoods would also be affected by phenomena such as salt intrusion. The delegation noted that, while many countries were implementing adaptation strategies in line with the Paris Agreement, the displacement of populations in coastal areas could not be avoided, nor could the decline in value of coastal properties.

164. The view was expressed that conferences addressing the contribution of satellite technologies to the implementation of the Sendai Framework and the Paris Agreement were useful.

165. The view was expressed that the GEONETcast service offered benefits as a low-cost platform for sharing space-based data. There were currently 70 GEONETcast stations operating in 18 countries.

166. The Subcommittee noted the in-kind contributions, including the provision of experts, made by States members of the Committee and regional support offices in 2017 to all technical advisory missions and related activities conducted by the Office for Outer Space Affairs through UN-SPIDER, and their efforts to share experiences with other interested countries.

167. The Subcommittee noted with appreciation the voluntary contributions made to the Office for Outer Space Affairs and its UN-SPIDER programme that were being made by member States, including the cash contributions from China and Germany, and again encouraged other member States to provide the Office's activities and programmes, including UN-SPIDER, with all necessary support, including increased financial support, to enable it to better respond to Member States' requests for assistance and to fully carry out its workplan for the next biennium.

VII. Recent developments in global navigation satellite systems

168. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 10, entitled "Recent developments in global navigation satellite systems", and reviewed issues related to the International Committee on Global Navigation Satellite Systems (ICG), the latest developments in the field of GNSS and new GNSS applications.

169. The representatives of China, Egypt, India, Indonesia, Israel, Japan, Pakistan, the Republic of Korea, the Russian Federation, Spain and the United States made statements under agenda item 10. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

170. The Subcommittee had before it the following documents:

(a) Note by the Secretariat on the twelfth meeting of the International Committee on Global Navigation Satellite Systems (A/AC.105/1158);

(b) Report of the Secretariat on activities carried out in 2017 in the framework of the workplan of the International Committee on Global Navigation Satellite Systems (A/AC.105/1159).

171. The Subcommittee was informed that the Office for Outer Space Affairs, as the executive secretariat of ICG, handled coordination for the planning of meetings of ICG and its Providers' Forum, in conjunction with sessions of the Committee and its subsidiary bodies. It was noted that the Office also maintained a comprehensive information portal for ICG and users of GNSS services and continued to play an active role in facilitating cooperation and communication among the providers and users of GNSS.

172. The Subcommittee expressed its appreciation to the Office for its efforts in promoting the use of GNSS through its capacity-building and information dissemination initiatives, in particular in developing countries.

173. The Subcommittee noted with appreciation the financial contributions made by the United States and the European Commission to the Office in support of GNSS-related activities and ICG, its Providers' Forum and its working groups.

174. The Subcommittee noted with satisfaction that the twelfth meeting of ICG and the nineteenth meeting of the Providers' Forum, organized by the Cabinet Office and the Ministry of Foreign Affairs of Japan, on behalf of the national Government, had been held in Kyoto, Japan, from 2 to 7 December 2017.

175. The Subcommittee noted the progress made by ICG, especially in the area of compatibility and interoperability among the different systems and in the area of GNSS spectrum protection and interference detection and mitigation. The Subcommittee recalled that ICG had invited an exchange of information related to GNSS spectrum protection and interference detection and mitigation under its agenda item on recent developments in GNSS. Considering the need to ensure continuous reception of GNSS signals, the importance of that topic was noted.

176. The Subcommittee also noted that the thirteenth meeting of ICG would be hosted by China and would be held in Xi'an, China, from 4 to 9 November 2018. The Subcommittee further noted the expression of interest from India to host the fourteenth meeting of ICG, in 2019, and by the Office for Outer Space Affairs to host the fifteenth meeting, in 2020.

177. The Subcommittee further noted that the Global Positioning System (GPS) of the United States continued to be a central pillar in an emerging international system of GNSS, and that the United States remained engaged in activities to ensure both compatibility and interoperability among the different services.

178. The Subcommittee noted that the United States had continued to broadcast GPS signals free of direct user charges and to work toward the launch of the next generation of satellites, GPS Block III, which would provide greater capability and improved service with the broadcast of the third civilian signal, "L1C". Work on an upgraded ground control system (called "OCX"), in support of the GPS Block III satellites, was continuing and, with the first launch expected in 2018, performance improvements and increased capabilities for all users were anticipated.

179. The Subcommittee also noted that the International Satellite System for Search and Rescue (COSPAS-SARSAT), a satellite-aided search and rescue programme for which the Medium-altitude Earth Orbit Search and Rescue (MEOSAR) distress signals relayed by GPS and Galileo of the European Union were in early operational capability, had been used in search and rescue efforts. It further noted that the MEOSAR system had been using upgraded GPS satellites, the GNSS of the Russian Federation (GLONASS) and Galileo of the European Union, orbiting in space at an altitude of between 19,000 and 24,000 km. It noted that the MEOSAR system provided near-instantaneous distress alerts and locations as well as significantly more satellites compared with the current constellations used in search and rescue. It was also noted that China was considering joining and contributing to that worldwide search and rescue capability.

180. The Subcommittee further noted that the civilian services of GLONASS were provided free of direct user charges and were accessible, effective and fully responsive to the needs of different users, and that the launch of the latest GLONASS-M navigation satellite into orbit supported the space segment of the system.

181. The Subcommittee noted that the System of Differential Correction and Monitoring, an augmentation of GLONASS, continued to be updated and was to be used in civil aviation for enhancing navigation precision. The provision of GLONASS-based precise point positioning to support applications requiring real-time access was being organized. A network of ground-based stations had been developed for the continuous monitoring of the characteristics of the GLONASS system and other GNSS in order to assess the quality of their performance.

182. The Subcommittee also noted that the interface control document for GLONASS Code Division Multiple Access signals in bands L1, L2 and L3 had been published in English. An open service performance standard was currently being developed, which demonstrated commitment to providing a basic performance standard for the system's users. The Subcommittee further noted that international cooperation existed that was aimed at making GLONASS an essential element of the international GNSS infrastructure, with benefits for users worldwide.

183. The Subcommittee further noted that the European GNSS Galileo provided a range of state-of-the-art positioning, navigation and timing services to users worldwide. The full Galileo constellation would consist of a total of 30 satellites and was expected to be completed by 2020.

184. The Subcommittee noted that the Galileo Security Monitoring Centre, an integral part of the Galileo infrastructure, had been facilitating the centralization of access to the Galileo Public Regulated Service and providing Galileo with security monitoring services in order to detect events, caused either accidentally or deliberately, that could result in the disruption of services.

185. The Subcommittee also noted that the BeiDou Navigation Satellite System (BDS), a global navigation satellite system compatible with other GNSS, had been established by China. The System was in full service and had provided positioning, navigation, timing and short-message communication services to the Asia-Pacific region since 2012. Four satellites of a new generation of satellites, the BeiDou-3 system, had been launched, and 18 satellites were scheduled to be launched by the end of 2018 as part of efforts to provide navigation and positioning services to countries involved in the Belt and Road Initiative.

186. The Subcommittee further noted that the BeiDou-3 system transmitted more refined navigation signals, with positioning accuracy of between 2.5 and 5 metres. The BDS industry chain had been completed, and BDS chips were used on a large scale, with the processing precision refined to 28 nanometres. BDS had been widely adopted in fields such as public security, transport, fisheries, electricity, forestry and disaster response. It was noted that, in order to promote the wide application of BDS, the sixth version of the BDS interface control document, one open service performance standard and the BDS white paper had been published. The system would constitute a complete space constellation and would provide global coverage by 2020.

187. The Subcommittee noted that India was currently implementing its satellite navigation programme, which consisted of two systems: the GPS-aided Geostationary Augmented Navigation System (GAGAN), which was a satellite-based augmentation system, and the Indian Regional Navigation Satellite System (IRNSS), which was an independent regional system. GAGAN had been certified for Navigation Performance, 0.1 Nautical Mile service level and for Approach with Vertical Precision certification by the Directorate General of Civil Aviation of India, thus enabling en route navigation and precision approach services using GAGAN. The Subcommittee also noted that GAGAN was the first satellite-based augmentation system to serve the equatorial region, and that it had been providing satellite-based navigation services with the accuracy and integrity required for civil aviation applications, as well as efficient air traffic management services over Indian airspace.

188. The Subcommittee also noted that the IRNSS constellation, also known as NavIC (Navigation with Indian constellation), provided satellite-based navigation services. It consisted of seven satellites: three in geostationary orbits and four in geosynchronous orbits. All seven IRNSS satellites, including IRNSS-1A and IRNSS-1G, had been put into orbit using the Polar Satellite Launch Vehicle (PSLV) of India. IRNSS-1A had been used exclusively for messaging services and the IRNSS-1I satellite was scheduled to be launched on board PSLV in the first half of 2018.

189. The Subcommittee further noted that Japan was currently constructing a Quasi-Zenith Satellite System (QZSS), named "Michibiki". The QZSS, a navigation satellite system that was compatible and interoperable with GPS, had been enabled to extend availability time by sharing the same positioning signals.

190. The Subcommittee noted that QZSS would be expanded and upgraded to become an operational regional satellite-based navigation system to improve positioning in the Asia-Pacific region. A constellation of four satellites would be established and the formal operation would begin during the 2018 Japanese fiscal year. A constellation of seven satellites would enable sustainable positioning to be completed by around the 2023 Japanese fiscal year.

191. The Subcommittee also noted that the Korean satellite-based augmentation system development, implementation and establishment programme, called "Korea Augmentation Satellite System" (KASS), had been initiated in 2014 with the objective of improving the performance, reliability and accuracy of the GPS navigation signals in the Korean peninsula. It was also noted that the KASS programme office had been established in the Korea Aerospace Research Institute.

192. The Subcommittee further noted that KASS would consist of seven reference stations, two processing stations, two control stations, three uplink stations and two geostationary satellites, and that KASS would meet the Approach with Vertical Guidance (APV-I) requirements, as defined in the ICAO standard. Following the KASS programme, a regional satellite navigation system, the Korea Positioning System, would be built, and would thus contribute to the international community as a regional provider of GNSS service. It was noted that the open service would be initiated in 2020 and the safety of life service would be initiated by the end of 2022.

193. The Subcommittee noted that other member States had reported on their activities in the use of GNSS technology for a wide range of applications. It was noted that those activities could be seen as a means for increasing the overall awareness of multi-GNSS within the scientific and engineering communities.

VIII. Space weather

194. In accordance with General Assembly resolution 72/77, the Scientific and Technical Subcommittee considered agenda item 11, entitled "Space weather".

195. The representatives of Canada, China, Egypt, Germany, India, Indonesia, Italy, Japan, Mexico, Nigeria, Pakistan, the Russian Federation, South Africa and the United States made statements under agenda item 11. The observers for the European Union and WMO also made statements under the item. During the general exchange of views, statements relating to the item were made by representatives of other member States.

196. The Subcommittee heard the following scientific and technical presentations:

(a) "NASA's Parker Solar Probe: the first ever mission to 'touch' the Sun", by the representative of the United States;

(b) "Space weather activities in Austria", by the representative of Austria;

(c) "COSPAR Panel on Space Weather: a forum for the realization of global weather road map goals", by the observer for COSPAR.

197. The Subcommittee had before it the following:

(a) Report of the United Nations/United States of America Workshop on the International Space Weather Initiative: the decade after the International Heliophysical Year 2007 (A/AC.105/1160);

(b) Note by the Secretariat on thematic priority 4 (International framework for space weather services) (A/AC.105/1171);

(c) Conference room paper submitted by the Rapporteur of the Expert Group on Space Weather containing a progress report on the work of the Expert Group, including in relation to UNISPACE+50 thematic priority 4 (International framework for space weather services) (A/AC.105/C.1/2018/CRP.14).

198. The Subcommittee noted that space weather, caused by solar variability, was an international concern, owing to its potential threat to space systems, human space flight and the ground- and space-based infrastructure upon which society increasingly relied. As such, it needed to be addressed in a global manner, through international cooperation and coordination, in order to be able to predict potentially severe space weather events and mitigate their impacts.

199. In that regard, the Subcommittee noted that space weather was addressed under UNISPACE+50 thematic priority 4 (International framework for space weather services) and noted with appreciation the work by the Expert Group on Space Weather of the Scientific and Technical Subcommittee as the implementation mechanism for that thematic priority.

200. The Subcommittee also noted the importance of being able to predict space weather accurately and the associated need for the participation of countries worldwide in space-based and ground-based measurements and forecast services. The Subcommittee also noted the importance of focused research that would lead to improvements in modelling and forecasting capabilities over time.

201. The Subcommittee further noted a number of national activities undertaken in space weather research, training and education to improve scientific and technical understanding of adverse space weather effects, with the aim of strengthening space weather resilience.

202. Some delegations expressed the view that activities related to space weather could have an impact on aviation and, in particular, could potentially interrupt high-frequency communications and satellite navigation. In that regard, the ICAO initiative of defining the establishment of selected global space weather information centres for actors in the aviation sector was noted.

203. The Subcommittee noted with appreciation the holding of a number of global conferences and workshops on space weather, including the flagship event under UNISPACE+50 thematic priority 4, namely the United Nations/United States of America Workshop on the International Space Weather Initiative held in Boston, United States, from 31 July to 4 August 2017, which had marked the tenth anniversary of the International Heliophysical Year and had provided an opportunity to recognize progress over the previous decade and to discuss strategies for future activities.

204. The Subcommittee noted that an international workshop on space weather was to be held in 2019 to help raise awareness among Member States of the importance of the impact of space weather.

205. The Subcommittee also noted that the International Space Weather Initiative Steering Committee had held a meeting on the margins of the current session of the Subcommittee to discuss the International Space Weather Initiative instrument arrays and their status of operation and coordination, and the operational use of space weather data.

206. At the 884th meeting of the Subcommittee, on 2 February, the Rapporteur of the Expert Group on Space Weather presented the progress made by the Expert Group during the meetings it had held on the margins of the current session of the Subcommittee.

207. At those meetings, attended by more than 28 experts from around the world, the Expert Group had reiterated the importance of the note by the Secretariat on thematic priority 4 (International framework for space weather services) (A/AC.105/1171), in particular the need for a new international coordination group on space weather. That new group could deliver improved international collaboration and coordination for

improved space weather services and ultimately enhance global resiliency against the adverse effects of space weather.

208. In that regard, the Expert Group presented a progress report (A/AC.105/C.1/2018/CRP.14), in which it recommended that the terms of reference for the international coordination group be proposed by 2019. It also recommended that those terms of reference be further developed during an international space weather workshop in the third quarter of 2019, with the aim of presenting them to the Subcommittee in 2020 for final approval.

209. The Expert Group presented the following updated workplan for the period up to 2021, consistent with its existing mandate and the recommendations contained in document A/AC.105/1171:

(a) The Expert Group will review the space weather-related activities and workplans of relevant United Nations entities, including ICAO and WMO, and those of States members of the Committee and national and international organizations. In addition, the Expert Group will identify and assess its role in the global space weather effort, promote coordination and communication among those entities and ensure that the efforts of the Subcommittee are complementary to its own;

(b) Recognizing the potential severity of the impact of space weather, the Expert Group will promote the increased involvement of member States in providing space weather monitoring, both from Earth and in space, and in developing, advancing, sharing and delivering space weather services;

(c) In relation to planning for the development of the proposed international coordination group for space weather, the Expert Group will transmit the reports of the drafting committee to the Subcommittee, which will consider the recommendations of the drafting committee relating to future membership, the terms of reference and the mandate of the coordination group;

(d) The Expert Group will report annually to the Subcommittee with regard to its progress, important issues that have been identified and specific actions that are recommended, including those related to the proposed international coordination group for space weather. The Expert Group will also make a recommendation for its updated workplan.

210. The Subcommittee took note of the work of the Expert Group, which had brought relevant entities together in order to mitigate the impact of space weather and had contributed to UNISPACE+50. In that regard, the Subcommittee recommended that the Expert Group continue its work, in accordance with the recommendations included in the Group's progress report (A/AC.105/C.1/2018/CRP.14).

IX. Near-Earth objects

211. In accordance with General Assembly resolution 72/77, the Scientific and Technical Subcommittee considered agenda item 12, entitled "Near-Earth objects".

212. The representatives of China, Egypt, Germany, Indonesia, Japan, Mexico, Pakistan, the United Arab Emirates and the United States made statements under agenda item 12. Statements were also made by the observers for IAWN and SMPAG. During the general exchange of views, statements relating to the item were made by representatives of other member States.

213. The Subcommittee heard a scientific and technical presentation entitled "Status report on the work of IAWN" by the observer for IAWN.

214. The Subcommittee had before it a conference room paper submitted by the Chairs of IAWN and SMPAG containing a proposal on renaming the agenda item on near-Earth objects (A/AC.105/C.1/2018/CRP.11).

215. The Subcommittee heard status reports by IAWN and SMPAG and noted with appreciation their efforts to share information with regard to discovering, monitoring

and physically characterizing potentially hazardous near-Earth objects in order to ensure that all nations, in particular developing countries with limited capacity to predict and mitigate an impact of a near-Earth object, were aware of potential threats.

216. The Subcommittee noted that nearly 22 million observations of asteroids had been collected in 2017 by the worldwide network of astronomical observatories in 47 countries. It also noted that, as at 1 January 2018, the number of known near-Earth objects had exceeded 17,500, of which 2,056 had been discovered in 2017, with 1,877 asteroids now catalogued whose orbits took them within 8 million kilometres of the Earth's orbit.

217. The Subcommittee also noted further progress in asteroid observation missions: Hayabusa2, the sample return mission of JAXA, was scheduled to arrive at the target asteroid "Ryugu" in June or July 2018; and the National Aeronautics and Space Administration (NASA) of the United States sample return mission OSIRIS-REx, an international mission also involving Canada, France and Japan, was scheduled to arrive at the target asteroid "Bennu" in the third quarter of 2018.

218. The Subcommittee further noted efforts to pursue research into asteroid impact mitigation technology options, such as the NASA Double Asteroid Redirection Test (DART) mission and the European Union-funded NEOShield-2 project, which was coordinated by Airbus Defence and Space, Germany, and had 11 partner organizations. The final results of the latter, which had been presented on 26 October 2017 to the European Commission, would serve to minimize the necessary preparation time for a near-Earth object deflection mission.

219. The Subcommittee noted a number of national activities and preparedness plans relating to near-Earth objects. Such activities included the work of the NASA Planetary Defense Coordination Office, which led the efforts of the Government of the United States to coordinate the response to any near-Earth object impact threat, working closely with the country's Federal Emergency Management Agency and Department of Defense, as well as other national agencies and international partners. Other activities were the establishment of the space debris observation and data application centre by CNSA, responsible for near-Earth object monitoring, data processing and early warning analysis; and efforts by the United Arab Emirates Space Agency, together with the national Government and through international and national partnerships, to establish reporting and responding mechanisms on space objects and debris and appropriate preparedness plans.

220. The Subcommittee also noted that the IAWN steering committee had held its fifth meeting on 30 January 2018, on the margins of the current session of the Subcommittee. The meeting had brought together international experts from a variety of disciplines related to the detection, characterization and notification of the potential hazard to the Earth posed by asteroids and comets and actions that could be taken to prevent or minimize the devastating effects of an asteroid impact.

221. The Subcommittee further noted that there were five new signatories to the Statement of Intent for Participation in IAWN, bringing the total number of signatories to 13. The signatories represented observatories and space institutions from China, Colombia, Mexico, the Republic of Korea, the Russian Federation and the United States, as well as Europe, and even included an amateur observer from the United Kingdom.

222. The Subcommittee noted that signatories to the Statement of Intent for Participation in IAWN recognized the importance of collaborative data analysis and being adequately prepared for communication with a variety of audiences about near-Earth objects, close approaches to the Earth by such objects, and impact risks. Signatories contributed a variety of ground- and space-based assets to detect and observe near-Earth objects and also contributed abilities in orbit computation, potential impact prediction and modelling of potential impact effects. A new web page was being launched by IAWN, hosted by the University of Maryland, and was available at http://iawn.net.

223. The Subcommittee also noted that, since the fifty-fourth session of the Subcommittee, SMPAG had held two meetings: its ninth meeting had been held in Toulouse, France, on 11 October 2017 and had been hosted by the National Centre for Space Studies of France (CNES); and its tenth meeting had been held on 31 January 2018, on the margins of the current session of the Subcommittee. Both meetings had been supported by the Office for Outer Space Affairs in its role as the secretariat to SMPAG, pursuant to General Assembly resolution 71/90. The Subcommittee was informed of the progress made under the SMPAG workplan, as contained in the reports on those meetings, available at http://smpag.net.

224. The Subcommittee further noted that FFG and CNSA had become members of SMPAG, and that the European Southern Observatory had become the fifth permanent observer of the Group. SMPAG currently had 18 members (space agencies) and 5 permanent observers (other entities).

225. The Subcommittee noted that ESA, the current SMPAG Chair, had been elected as Chair for another two-year term (2018–2020).

226. The Subcommittee also noted that the SMPAG Ad Hoc Working Group on Legal Issues, established in 2016 and coordinated by DLR, had held a meeting on 30 January, on the margins of the current session of the Subcommittee. The aim of that meeting had been to work on a draft report, in accordance with its scope of work to identify, formulate and prioritize relevant legal issues relating to the work of the Group and consider legal issues relevant to the work of SMPAG in the context of existing international treaties governing activities in outer space.

227. The Subcommittee took note of the SMPAG statement on deflection missions that the Group had prepared in one of its previous meetings. In that statement, the Group had stressed that, given the degree of international interest in asteroid research and awareness of the impact hazard, advantage should be taken of opportunities to investigate asteroid deflection physics, techniques and effects as part of science and technology demonstration missions.

228. The Subcommittee noted that IAWN and SMPAG were continuing to work with the Office for Outer Space Affairs on issues related to general communication on near-Earth objects by the public, communication with Member States in the event of an impact warning and the possibility of including a near-Earth object module as part of the Office's UN-SPIDER technical advisory missions on disaster preparedness. The latter was related to the work of IAWN to provide information to relevant parties, such as emergency response agencies.

229. The Subcommittee also noted that a brochure on near-Earth objects and planetary defence was being prepared by IAWN, SMPAG and the Office for Outer Space Affairs. It would be launched in all the official languages of the United Nations for UNISPACE+50, in June 2018.

230. The Subcommittee further noted a proposal by IAWN and SMPAG to rename the item on its agenda entitled "Near-Earth objects" to "Near-Earth objects and planetary defence", with the aim of better reflecting and raising awareness among member States of all the aspects of ongoing activities, from near-Earth object discovery, monitoring and characterization to determining the most effective and appropriate methods for mitigating risks from hazardous near-Earth objects and understanding the practical and legal implications of such activities.

231. The view was expressed that introducing the term "defence" into the agenda item on near-Earth objects could be misunderstood by the general public and decision makers and that work in the area of mitigating a potentially hazardous near-Earth object was still ongoing.

232. The Subcommittee noted that the fifth IAA International Planetary Defence Conference had been held in Tokyo from 15 to 19 May 2017, and had been attended by 192 experts from 24 countries. The sixth conference was planned to be held in the second quarter of 2019 in the Washington, D.C., area.

233. The Subcommittee also noted that the next meeting of the IAWN steering committee and of SMPAG would take place in conjunction with the meeting of the Division for Planetary Sciences of the American Astronomical Society, which was to be held in Knoxville, Tennessee, United States, from 21 to 26 October 2018.

X. Use of nuclear power sources in outer space

234. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 13, entitled "Use of nuclear power sources in outer space".

235. The representatives of China, Mexico, Pakistan, the Russian Federation, the United States and Venezuela (Bolivarian Republic of), as well as the representative of Argentina, on behalf of the Group of Latin American and Caribbean States, made statements under agenda item 13. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

236. The Subcommittee heard a scientific and technical presentation entitled "Preliminary safety research on space nuclear power sources", by the representative of China.

237. The Subcommittee acknowledged that some States and an international intergovernmental organization were developing, or considering developing, legal and regulatory instruments on the safety of the use of nuclear power sources in outer space, taking into account the contents and requirements of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space and of the Safety Framework for Nuclear Power Source Applications in Outer Space.

238. The Subcommittee stressed the value and importance of implementing the voluntary Safety Framework for Nuclear Power Source Applications in Outer Space, which had been developed by the Subcommittee together with the International Atomic Energy Agency.

239. The view was expressed that the Safety Framework should provide all the necessary information pertinent to the challenges of using nuclear power sources that were faced by member States and other actors.

240. The view was expressed that the effects of the use of nuclear power sources in outer space on humans and the environment had not been identified, that there was still no clearly defined regulatory framework for establishing the responsibilities of States with regard to the use of nuclear power sources and that potentially critical situations arising from irresponsible practices in that area had not been addressed. The delegation expressing that view was also of the view that, in that connection, the Safety Framework in its current form was still insufficient.

241. The view was expressed that, to date, the Working Group on the Use of Nuclear Power Sources in Outer Space had not identified any challenges to implementing the Safety Framework that would require any modifications or additions to it. The delegation expressing that view was also of the view that the Safety Framework represented a significant advance in the development of safe nuclear power source applications and that the implementation of it by Member States and international intergovernmental organizations would provide assurance to the global public that nuclear power source applications for use in outer space were being developed, launched and used in a safe manner. Therefore, the national implementation of the Safety Framework should be strongly encouraged.

242. Some delegations expressed the view that it was important to continue to study, analyse and evaluate various aspects, practices and regulations pertinent to the use of nuclear power sources in space, and that such activities must be beneficial, not detrimental, to humanity. The delegations expressing that view were also of the view that States were responsible for regulating the use of nuclear energy in space and that it was their duty to observe the relevant international legal regime. In that connection, and taking into account the Safety Framework, it was important for the Subcommittee

to continue addressing the issue through the application of appropriate strategies, long-term planning and the establishment of adequate and updated regulatory frameworks.

243. Some delegations expressed the view that more consideration should be given to the use of nuclear power sources in terrestrial orbits, specifically in the geostationary orbit and low Earth orbit, in order to address the problem of potential collisions of nuclear-powered space objects in orbit and the incidents or emergencies that could be created by the accidental re-entry of such objects into the Earth's atmosphere, as well as the impact of such a re-entry on the Earth's surface, human life and health and the ecosystem.

244. Some delegations expressed the view that nuclear power sources should be used on board spacecraft only for deep space missions, or when their use was unavoidable.

245. The view was expressed that the Sun was a source of energy that could effectively serve present and future needs of humankind in the areas of satellite applications, such as Earth observation, telecommunications, tele-health and tele-education.

246. The view was expressed that the use of space nuclear power sources was an important factor in enabling a broader scale of outer space exploration and the undertaking of a wide spectrum of tasks in deep space that required the use of power-consuming and efficient sources of energy.

247. Some delegations expressed the view that, for more than five and a half decades, nuclear power source applications had played a critical role in the exploration of space, enabling missions of scientific discovery to destinations across the solar system.

248. Some delegations expressed the view that delegates should continue to work towards a new multi-year workplan for the period up to 2021, with the objectives of promoting and facilitating the implementation of the Safety Framework through appropriate exchanges of information and plans and discussions within the Working Group.

249. The view was expressed that the efforts of the Working Group on the Use of Nuclear Power Sources in Outer Space to meet the objectives of its multi-year workplan would further the safe development and use of nuclear power sources in outer space.

250. Pursuant to General Assembly resolution 72/77, the Subcommittee, at its 875th meeting, on 29 January, reconvened its Working Group on the Use of Nuclear Power Sources in Outer Space, with Sam A. Harbison (United Kingdom) as Chair.

251. The Working Group on the Use of Nuclear Power Sources in Outer Space held three meetings. At its 892nd meeting, on 8 February, the Subcommittee endorsed the report and recommendations of the Working Group.

XI. Long-term sustainability of outer space activities

252. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 14, entitled "Long-term sustainability of outer space activities", under the workplan contained in the report of the Committee on the Peaceful Uses of Outer Space on its fifty-fourth session (see A/66/20, annex II) and extended by the Committee at its fifty-seventh and fifty-ninth sessions (A/69/20, para. 199, and A/71/20, para. 137).

253. The representatives of Austria, China, Germany, India, Japan, Pakistan, the Republic of Korea, the Russian Federation, South Africa, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 14. A statement was made under the item by the representative of Argentina on behalf of the Group of Latin American and Caribbean States. During the general exchange of

views, statements relating to the item were also made by representatives of other member States.

254. The Subcommittee had before it the following:

(a) Working paper by the Chair of the Working Group on the Long-term Sustainability of Outer Space Activities entitled "Outline for the report of the Working Group on the Long-term Sustainability of Outer Space Activities" (A/AC.105/C.1/L.357);

(b) Note by the Secretariat entitled "Guidelines for the long-term sustainability of outer space activities" (A/AC.105/C.1/L.362/Rev.1);

(c) A conference room paper by the Chair of the Working Group entitled "Working Group on the Long-term Sustainability of Outer Space Activities: preambular text and nine guidelines" (A/AC.105/C.1/2018/CRP.18);

(d) A conference room paper by the Chair of the Working Group entitled "Working Group on the Long-term Sustainability of Outer Space Activities: preambular text and nine guidelines" (A/AC.105/C.1/2018/CRP.18/Rev.1);

(e) A conference room paper by the Chair of the Working Group entitled "Working Group on the Long-term Sustainability of Outer Space Activities: guidelines still under discussion" (A/AC.105/C.1/2018/CRP.19);

(f) A non-paper by the Chair of the Working Group entitled "Possible General Assembly resolution on guidelines for the long-term sustainability of outer space activities".

255. In accordance with General Assembly resolution 72/77, the Working Group on the Long-term Sustainability of Outer Space Activities was reconvened, with Peter Martinez (South Africa) as Chair.

256. The Subcommittee agreed on the importance of the work being undertaken on the long-term sustainability of outer space activities. In that connection, it noted that the fifth intersessional meeting of the Working Group had been held in Vienna from 2 to 6 October 2017.

257. Some delegations expressed the view that the Committee and its subcommittees had a fundamental role in addressing the long-term sustainability of outer space activities, as the issues demanded a multilateral approach and needed to be addressed at the international level.

258. Some delegations welcomed the first set of guidelines for the long-term sustainability of outer space activities (A/71/20, annex) as tangible progress by the Committee on the topic of the long-term sustainability of outer space activities and as a successful milestone that underscored the Committee's role in fostering international cooperation in order to ensure that all States could continue to benefit from the use of space in the long term.

259. Some delegations expressed the view that the successful completion of guidelines for the long-term sustainability of outer space activities would strengthen the role of the Committee as the prime multilateral forum for the progressive development and codification of international norms and standards guiding the activities of States in outer space.

260. Some delegations expressed the view that agreement on a compendium of guidelines for the long-term sustainability of outer space activities should be reached by June 2018 and that completing a compendium in 2018 would represent an important deliverable by the Committee in the year in which UNISPACE+50 was celebrated.

261. Some delegations recalled the conference room paper submitted by the Group of Latin American and Caribbean States containing comments and proposed amendments to the updated set of draft guidelines for the long-term sustainability of outer space activities (A/AC.105/C.1/2015/CRP.19/Rev.1), and expressed the view

that essential principles that should continue to guide the work of the Working Group on the Long-term Sustainability of Outer Space Activities included: (a) that outer space should be the province of all humankind and therefore must be explored and used responsibly for the benefit of all; (b) that outer space must be preserved for future generations; and (c) that outer space should be used only for peaceful purposes.

262. The view was expressed that a compendium of guidelines for the long-term sustainability of outer space activities would contribute to strengthening norms on conduct in outer space and ensuring that the international community could further leverage space and space assets for sustainable development on Earth for the benefit of humankind.

263. The view was expressed that States could begin voluntarily implementing the guidelines for the long-term sustainability of outer space activities to the greatest extent practicable, in accordance with their needs, conditions and capabilities. The delegation expressing that view also provided three examples of how it had already begun implementing the 12 guidelines agreed by the Committee at its sixtieth session, which represented best practices in the safe and responsible use of space.

264. The view was expressed that any guidelines developed under the agenda item on the long-term sustainability of outer space activities should be in strict compliance with current legal regimes on outer space activities. The delegation expressing that view was also of the view that the guidelines should not be legally binding and should be applied on a voluntary basis, with each State being allowed to take measures in phases, in accordance with their domestic legal framework.

265. The view was expressed that it was important that the long-term sustainability of outer space activities be considered from both the technical and legal perspectives. The delegation expressing that view welcomed proposals made under UNISPACE+50 thematic priority 2 to address the interlinkages between the outcome of the Working Group on the Long-term Sustainability of Outer Space Activities and the treaties, principles and other instruments that comprised the international legal regime governing outer space activities.

266. The view was expressed that the Working Group should, when considering all proposals for guidelines, take into account the methods of work and all related issues listed in its terms of reference and methods of work (A/66/20, annex II).

267. The view was expressed that, when deciding on the modalities of work on guidelines for the long-term sustainability of outer space activities, all delegations were, in principle, in agreement that all participants in space activities, among other measures, had to approach responsibly the choice of methods and means for their space projects, in particular by keeping in mind the importance of avoiding emerging situations that could negatively impact the space activities of other States. The view was also expressed that that approach was in line with the provisions of the Outer Space Treaty and the recommendations of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (see A/68/189).

268. Some delegations expressed the view that outer space should be used exclusively for peaceful purposes and that all legal means should be sought to preserve outer space for such purposes. Delegations expressing that view also stated that it was essential for the international community to recognize that outer space should never be an environment where hostile activities could be initiated or developed, whether or not such hostilities included the deployment of weapons of any kind.

269. Some delegations expressed the view that the guidelines for the long-term sustainability of outer space activities should not become an instrument for countries that had traditionally managed space technology to impose restrictions on other States that aspired to develop and use space technology as a fundamental tool to improve the living conditions of their inhabitants.

270. The view was expressed that the adoption of any guidelines for the long-term sustainability of outer space activities should be based on the reality of the development of space technologies and applications, taking into full consideration the concerns of all parties, in particular the needs of developing countries, when participating in space activities and developing their space industries.

271. The view was expressed that the guidelines for the long-term sustainability of outer space activities highlighted the importance of international cooperation and technology transfer as an effective means of promoting research programmes and developing space sector capabilities.

272. The view was expressed that guidelines regarding international cooperation should fully embody the vision and spirit of equality, openness, inclusiveness and non-discrimination.

273. The view was expressed that the set of guidelines, similarly to any other legislative, normative or other regulatory documents, should not be frozen in their conception, but rather should be understood as remaining open to amendment or revision. The delegation expressing that view was also of the view that improvements to existing arrangements and new proposals on the resolution of problems would be warranted in the case of the appearance of new possibilities for the resolution of existing problems or the emergence of new challenges and, most importantly, that such proposals, if drafted using objective, well-defined and rational criteria, would lead to success.

274. At its 894th meeting, on 9 February, the Subcommittee endorsed the report of the Working Group on the Long-term Sustainability of Outer Space Activities, which is contained in annex III to the present report.

XII. Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries, without prejudice to the role of the International Telecommunication Union

275. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 15, entitled "Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries, without prejudice to the role of the International Telecommunication Union", as a single issue/item for discussion.

276. The representatives of Indonesia, Mexico, the Netherlands, Oman, Pakistan, the Russian Federation, Saudi Arabia, South Africa, Sri Lanka and Venezuela (Bolivarian Republic of), as well as the representative of Argentina, on behalf of the Group of Latin American and Caribbean States, made statements under agenda item 15. During the general exchange of views, statements relating to the item were made by representatives of other member States.

277. In accordance with the invitation extended by the Subcommittee at its fifty-fourth session, in 2017 (A/AC.105/1138, para. 277), the observer for ITU presented a report concerning the contribution of ITU to the peaceful uses of outer space, including the use of the geostationary satellite orbit and other orbits. In that connection, the Subcommittee took note with appreciation of the information provided in the annual report for 2017 of the Radiocommunication Bureau of ITU on the use of the geostationary satellite orbit and other orbits (see www.itu.int/en/ITU-R/space/snl/Pages/reportSTS.aspx), as well as other documents referred to in

conference room paper A/AC.105/C.1/2018/CRP.7. The Subcommittee invited ITU to continue to submit reports to it.

278. Some delegations expressed the view that the geostationary orbit was a limited natural resource that was at risk of becoming saturated, thereby threatening the sustainability of space activities in that environment; that its use should be rationalized; and that it should be made available to all States, under equitable conditions, irrespective of their current technical capabilities, taking into particular account the needs of developing countries and the geographical position of certain countries. Those delegations were also of the view that it was important to use the geostationary orbit in compliance with international law and with the legal framework established by the United Nations and ITU.

279. Some delegations expressed the view that the geostationary orbit, as a limited natural resource clearly in danger of saturation, must be used rationally, efficiently, economically and equitably. That principle was deemed fundamental to safeguarding the interests of developing countries and countries with a certain geographical position, as set out in article 44, paragraph 196.2, of the Constitution of ITU, as amended by the Plenipotentiary Conference held in Minneapolis, United States, in 1998.

280. The view was expressed that the geostationary orbit was an integral part of outer space and that, therefore, its use should be governed by the provisions of the United Nations treaties on outer space and of ITU Radio Regulations.

281. Some delegations expressed the view that the geostationary orbit provided unique potential for access to communications and information, in particular for assisting developing countries in implementing social programmes and educational projects, disseminating knowledge and providing medical assistance.

282. Some delegations expressed the view that, while the principle of "first come, first served" promoted efficient use of the geostationary orbit, it was detrimental to developing countries and emerging spacefaring nations, as it resulted in difficulties in coordinating the use of frequencies and satellite orbits to "latecomers" entering the space arena.

283. Some delegations expressed the view that the utilization by States of the geostationary orbit on the basis of "first come, first served" was unacceptable and that the Subcommittee, with the involvement of ITU, should therefore develop a regime guaranteeing equitable access to orbital positions for States.

284. The view was expressed that the current regime for the exploitation and utilization of the geostationary orbit mostly provided opportunities to countries with greater financial and technical capabilities and, in that connection, there was a need to take anticipatory measures to address the potential dominance of such countries in the utilization of space in order to address the needs of developing countries and of countries in particular geographical areas, such as those in equatorial regions.

285. Some delegations expressed the view that the current system of reserving slots in the geostationary orbit was abused by attempts to reserve numerous orbital positions for the purpose of reselling them at more expensive prices, thereby hindering the development of the space programmes of those willing to utilize that unique orbit diligently. The delegations expressing that view were also of the view that the distribution of those critical locations should be made fairly, in accordance with the principle of equality and taking into account the limited character of the orbit, and that each State should have at least two orbital slots reserved in the location near its national territory.

286. The Subcommittee noted the experience of member States in research into the technical aspects of an intensive introduction into geostationary orbit fixed-satellite-service networks of a new generation of satellites, namely high-throughput satellites (HTS). The results of studies showed that existing norms pertinent to off-axis emissions from the Earth stations of the fixed satellite service

networks did not guarantee the protection of HTS networks. In that connection, the delegation expressing that view was of the view that the resolution of that problem was within the competence of ITU-R Study Group 4.

287. Some delegations expressed the view that the congestion of the orbital frequency resources, including the geostationary orbit, was continuing to increase, which meant that there was a growing risk that the opportunities for effective utilization by developing countries of their rightfully guaranteed slots in the Fixed-Satellite Service (FSS) and Broadcasting-Satellite Service (BSS) plans of ITU were diminishing at an even faster pace. In that connection, the delegations expressing that view were also of the view that there was a need to revise those plans in order to ensure equitable, fair and sustainable use by all States of the orbital frequency resources, including the geostationary orbit.

288. The Subcommittee noted that ITU had issued a recommendation entitled "Environmental protection of the geostationary-satellite orbit", which provided guidance about disposal orbits for satellites in the geostationary satellite orbit.

289. Some delegations expressed the view that, in order to ensure the sustainability of the geostationary orbit, as well as to assure guaranteed and equitable access to the geostationary orbit based on the needs of all nations, taking into particular account the needs and interests of developing countries, it was necessary to keep that issue on the agenda of the Subcommittee and to explore it further, through the creation of appropriate working groups and legal and technical intergovernmental panels, as necessary.

XIII. Draft provisional agenda for the fifty-sixth session of the Scientific and Technical Subcommittee

290. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 16, entitled "Draft provisional agenda for the fifty-sixth session of the Scientific and Technical Subcommittee".

291. The Subcommittee noted that the Secretariat had scheduled its fifty-sixth session to be held from 11 to 22 February 2019.

292. The Subcommittee also noted that, in accordance with General Assembly resolution 72/77, it would submit to the Committee its proposal on the draft provisional agenda for its fifty-sixth session and recommended that the following items be included in the draft provisional agenda:

1. Adoption of the agenda.
2. Statement by the Chair.
3. General exchange of views and introduction of reports submitted on national activities.
4. United Nations Programme on Space Applications.
5. Space technology for sustainable socioeconomic development.
6. Matters relating to remote sensing of the Earth by satellite, including applications for developing countries and monitoring of the Earth's environment.
7. Space debris.
8. Space-system-based disaster management support.
9. Recent developments in global navigation satellite systems.
10. Space weather.
11. Near-Earth objects.

12. Long-term sustainability of outer space activities.

13. Use of nuclear power sources in outer space.

(Work for 2019 as reflected in the multi-year workplan of the Working Group (see A/AC.105/1138, para. 237 and annex II, para. 9))

14. Space and global health.

(Work under a multi-year workplan of the working group to be determined (see para. 96 above and annex I, para. 14, to the present report))

15. Examination of the physical nature and technical attributes of the geostationary orbit and its utilization and applications, including in the field of space communications, as well as other questions relating to developments in space communications, taking particular account of the needs and interests of developing countries, without prejudice to the role of the International Telecommunication Union.

(Single issue/item for discussion)

16. Draft provisional agenda for the fifty-seventh session of the Scientific and Technical Subcommittee.

17. Report to the Committee on the Peaceful Uses of Outer Space.

293. The Subcommittee further noted that, in accordance with the agreement that it had reached at its forty-fourth session, in 2007 (A/AC.105/890, annex I, para. 24), the symposium at the fifty-sixth session of the Subcommittee, in 2019, was to be organized by COSPAR and that the topic of the symposium would be communicated to and decided upon by the Committee at its sixty-first session, to be held from 20 to 29 June 2018.

294. The Subcommittee noted with satisfaction the breadth of representation from the United Nations system engaged by the Office in the organization of the side meeting on the theme "The global space partnership for the Sustainable Development Goals". In addition to representatives of the Office for Outer Space Affairs, representatives of ITU, the Operational Satellite Applications Programme of the United Nations Institute for Training and Research and the United Nations Development Programme had attended the meeting. The panellists had also included a representative of CNES.

Annex I

Report of the Working Group of the Whole

1. In accordance with paragraph 9 of General Assembly resolution 72/77, the Scientific and Technical Subcommittee, at its fifty-fifth session, reconvened its Working Group of the Whole.

2. From 30 January to 9 February 2018, the Working Group held 13 meetings, with Mylswamy Annadurai (India) as Chair. The Working Group considered the following items:

(a) Preparations for UNISPACE+50;

(b) Space technology for sustainable socioeconomic development;

(c) Draft provisional agenda for the fifty-sixth session of the Scientific and Technical Subcommittee.

3. The Working Group had before it the documents listed in paragraph 79 of the report of the Subcommittee on its fifty-fifth session.

4. At its 13th meeting, on 9 February, the Working Group adopted the present report.

I. Preparations for UNISPACE+50

5. At the 1st meeting of the Working Group, on 30 January 2018, the Director of the Office for Outer Space Affairs of the Secretariat informed the Working Group of the status of preparations for UNISPACE+50. In her statement, the Director underscored the readiness of the Office to work with member States and all relevant stakeholders towards UNISPACE+50 and beyond in order to build a foundation that would help define the role of space activities in both addressing overarching long-term development concerns and contributing to global efforts towards achieving the goals and targets of the 2030 Agenda for Sustainable Development.

6. At its 9th meeting, on 6 February, the Working Group heard a presentation by a representative of the Office for Outer Space Affairs regarding the organizational matters for the UNISPACE+50 high-level segment, to be held on 20 and 21 June 2018, outreach events to be held on 18 and 19 June 2018 and a dedicated exhibit on UNISPACE+50 to be held from 18 to 29 June 2018. Further information was available on the website of the Office for Outer Space Affairs (www.unoosa.org).

7. The Working Group took note of General Assembly resolution 72/79, in which the Assembly had emphasized the significance of the high-level segment of UNISPACE+50. The Working Group noted that, in that resolution, the General Assembly had requested the Committee on the Peaceful Uses of Outer Space to submit a draft resolution on the outcomes of UNISPACE+50 for consideration by the Assembly at its seventy-third session.

8. The Working Group held discussions on a draft resolution, contained in document A/AC.105/C.1/L.364 and revised in A/AC.105/C.1/2018/CRP.16/Rev.1, that had been prepared in response to General Assembly resolution 72/79.

9. The Working Group noted that, in order to advance the work on the preparation of a draft resolution, the delegation of Canada would take the lead and organize an informal meeting before the fifty-seventh session of the Legal Subcommittee that would be open to participation by all States members of the Committee. The aim of the meeting would be to jointly prepare the text of a draft resolution based on the existing text (A/AC.105/C.1/2018/CRP.16/Rev.1). The result of the work of that informal meeting would be presented in a working paper that could be considered by the Working Group on the Status and Application of the Five United Nations Treaties on Outer Space at the fifty-seventh session of the Legal Subcommittee, to be held in

Vienna from 9 to 20 April 2018. The final modalities and timing of the meeting would be conveyed to States members of the Committee by the delegation of Canada. The results of the work at the meeting would be made available by the Secretariat in an official document in all the official languages of the United Nations prior to the fifty-seventh session of the Legal Subcommittee.

10. The Working Group requested the Secretariat to facilitate the informal meeting.

11. The Working Group encouraged the lead of the informal meeting to coordinate with the Chair of the Working Group on the Status and Application of the Five United Nations Treaties on Outer Space and the incoming Chairs of the Committee for the period 2018–2019 in order to ensure continuity and coherency in the process.

II. Space technology for sustainable socioeconomic development

12. The Working Group noted that the Expert Group on Space and Global Health had held its fourth meeting on 31 January and 1 February 2018, on the margins of the fifty-fifth session of the Scientific and Technical Subcommittee. The meeting had been chaired jointly by Canada and Switzerland and the principle objective of the meeting had been to review the key achievements during the implementation of the Expert Group's three-year workplan (contained in A/AC.105/1088, annex I, para. 7 (b)). The Expert Group had agreed that the objectives set forth in that workplan were realized.

13. The Working Group took note of the progress report by the Co-Chairs of the Expert Group on Space and Global Health on the fourth meeting of the Expert Group (A/AC.105/C.1/2018/CRP.17). On the basis of the recommendations contained in that report and in the final report on UNISPACE+50 thematic priority 5 (A/AC.105/1172), the Working Group agreed to establish a new item entitled "Space and global health" on the agenda of the Subcommittee, under a multi-year workplan that was to be determined.

14. The Working Group of the Whole agreed to establish a working group under that item, with Antoine Geissbühler (Switzerland) as Chair. The Working Group of the Whole also agreed that the Chair of the newly established working group, together with the Secretariat, would present to the fifty-sixth session of the Subcommittee, in 2019, a proposal for a multi-year workplan for that working group, taking into account the role of the Expert Group on Space and Global Health.

III. Draft provisional agenda for the fifty-sixth session of the Scientific and Technical Subcommittee

15. The Working Group noted that, in accordance with General Assembly resolution 72/77, the Scientific and Technical Subcommittee would submit to the Committee its proposal for the draft provisional agenda for the fifty-sixth session of the Subcommittee, to be held in 2019. The Working Group agreed that the draft provisional agenda be considered by the Subcommittee under its agenda item 16.

16. The Working Group recalled that, at its sixtieth session, in 2017, the Committee on the Peaceful Uses of Outer Space had requested the Secretariat to prepare a conference room paper to be submitted to the Scientific and Technical Subcommittee at its fifty-fifth session, containing a proposed workplan on how to improve overall governance and the method of work of the Committee as a whole (A/72/20, para. 327). In that connection, the Working Group had before it a conference room paper entitled "Governance and the method of work of the Committee and its subsidiary bodies: proposed workplan" (A/AC.105/C.1/2018/CRP.13).

17. On the basis of that conference room paper, the Working Group took note of the following proposed workplan and recommended that the workplan be considered by

the Legal Subcommittee at its fifty-seventh session, in April 2018, and further considered by the Committee at its sixty-first session, in June 2018:

2018 The Secretariat, jointly with interested members of the Group of Bureaux Members, to prepare a document in all the official languages of the United Nations, in advance of the fifty-sixth session of the Scientific and Technical Subcommittee, in 2019, containing a categorization of the range of organizational measures raised by delegations in sessions of the Committee and its subsidiary bodies over the past decade and an outline of additional topics for consideration on organizational matters and the method of work of the Committee and its subsidiary bodies.

2019 Consideration of the document at the sessions of the Scientific and Technical Subcommittee and the Legal Subcommittee, and of the Committee, under its agenda item entitled "Future role of the Committee", which might be introduced as an agenda item for both subcommittees, as appropriate. The work of the Working Group on the Status and Application on the Five United Nations Treaties on Outer Space of the Legal Subcommittee, under the multi-year workplan on UNISPACE+50 thematic priority 2, to be taken into account.

2020 The Secretariat, jointly with interested members of the Group of Bureaux Members, to present a revised version of the document in all the official languages of the United Nations, taking into account the outcome of the considerations undertaken in 2019, containing concrete, action-oriented proposals for consideration by the two subcommittees and the Committee.

2021 The Secretariat, jointly with interested members of the Group of Bureaux Members, to present a second revised version of the document in all the official languages of the United Nations for final inputs by the two subcommittees. The document to be updated in all the official languages of the United Nations, for action by the Committee.

Annex II

Report of the Working Group on the Use of Nuclear Power Sources in Outer Space

1. Pursuant to General Assembly resolution 72/77, the Scientific and Technical Subcommittee, at its 875th meeting, on 29 January, reconvened its Working Group on the Use of Nuclear Power Sources in Outer Space, with Sam A. Harbison (United Kingdom of Great Britain and Northern Ireland) as Chair.

2. The Working Group recalled the following objectives of its multi-year workplan for the period 2017–2021, adopted by the Subcommittee at its fifty-fourth session, in 2017 (see A/AC.105/1138, annex II, paras. 8 and 9):

> Objective 1. Promote and facilitate the implementation of the Safety Framework for Nuclear Power Source Applications in Outer Space by:
>
> (a) Providing an opportunity for member States and international intergovernmental organizations considering or initiating involvement in space NPS applications to summarize and discuss their plans, progress to date and any challenges faced or foreseen in implementing the Safety Framework;
>
> (b) Providing an opportunity for member States and international intergovernmental organizations with experience in space NPS applications to make presentations on challenges identified under subparagraph (a) above, and on their mission-specific experiences in implementing the guidance contained in the Safety Framework.
>
> Objective 2. Discuss within the Working Group advances in knowledge and practices and their potential for enhancing the technical content and scope of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space through presentations from member States and international intergovernmental organizations based on one or more of the following:
>
> (a) Their practical experience in implementing the Principles;
>
> (b) Their knowledge of advances in science and technology relating to space NPS;
>
> (c) Their knowledge of internationally accepted norms, standards and practices regarding radiation protection and nuclear safety.

3. In accordance with objective 1 of its multi-year workplan, the Working Group received information from member States and an international intergovernmental organization on their progress in implementing the Safety Framework. The Working Group also reviewed the status of technical presentations pursuant to the invitation extended in 2017 and noted that a number of member States and an international intergovernmental organization intended to deliver technical presentations at the sessions of the Subcommittee to be held in 2019 and 2020.

4. The Working Group noted with satisfaction that a number of States and an international intergovernmental organization had implemented, or were in the process of implementing, the Safety Framework, and had reported that it provided a valuable foundation for developing their respective safety frameworks for the use of space NPS.

5. The Working Group took note of the technical presentation entitled "Preliminary safety research on space nuclear power sources" that had been delivered during the fifty-fifth session of the Subcommittee by the representative of China.

6. In relation to objective 2 of its multi-year workplan, the Working Group recalled a conference room paper submitted by France at the fifty-third session of the Subcommittee, in 2016, entitled "Proposal to revise the Principles Relevant to the Use

of Nuclear Power Sources in Outer Space adopted by the General Assembly in its resolution 47/68 of 14 December 1992" (A/AC.105/C.1/2016/CRP.7).

7. In accordance with that objective, the Working Group discussed advances in knowledge and practices and their potential for enhancing the technical content and scope of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space. The Working Group exchanged views on practical experiences in implementing the Principles in relation to enhancing the safety of space NPS applications. From that preliminary discussion, the Working Group identified a number of aspects of the Principles that appeared worthy of further discussion. They included the structure and scope of the Principles, the treatment of space NPS safety in principles 3 and 4 and the general treatment of radiation protection and safety standards in the Principles.

8. The Working Group agreed to continue the exchange of views on the Principles in the course of its intersessional work and emphasized the importance of relevant presentations from member States and international intergovernmental organizations, as foreseen in subparagraphs (a), (b) and (c) of objective 2.

9. The Working Group also agreed that intersessional work would be required in order to successfully meet the objectives of its multi-year workplan and decided to conduct its intersessional work in 2018 by holding teleconferences, the first of which would be held on 14 June 2018.

10. In accordance with its multi-year workplan, the Working Group requested the Secretariat to invite, by no later than April 2018, States members of the Committee and international intergovernmental organizations to make technical presentations pursuant to objective 1 and/or objective 2 of the workplan. The Working Group also requested the Secretariat to allocate sufficient time for the work of the Working Group during the fifty-sixth session of the Subcommittee, in 2019, in order to ensure the effective delivery of technical presentations, to be followed by an exchange of views and discussions.

11. At its 3rd meeting, on 8 February, the Working Group adopted the present report.

Annex III

Report of the Working Group on the Long-term Sustainability of Outer Space Activities

1. In accordance with paragraph 9 of General Assembly resolution 72/77, the Scientific and Technical Subcommittee, at its fifty-fifth session, reconvened its Working Group on the Long-term Sustainability of Outer Space Activities.

2. The Working Group on the Long-term Sustainability of Outer Space Activities held meetings from 29 January to 9 February 2018, with Peter Martinez (South Africa) as Chair.

3. In accordance with the workplan extended by the Committee on the Peaceful Uses of Outer Space at its fifty-ninth session (A/71/20, para. 137), the Working Group had before it the following:

(a) Note by the Secretariat entitled "Guidelines for the long-term sustainability of outer space activities" (A/AC.105/C.1/L.362/Rev.1);

(b) Working paper by the Chair of the Working Group entitled "Outline for the report of the Working Group on the Long-term Sustainability of Outer Space Activities" (A/AC.105/C.1/L.357);

(c) A conference room paper by the Chair of the Working Group entitled "Working Group on the Long-term Sustainability of Outer Space Activities: preambular text and nine guidelines" (A/AC.105/C.1/2018/CRP.18);

(d) A conference room paper by the Chair of the Working Group entitled "Working Group on the Long-term Sustainability of Outer Space Activities: preambular text and nine guidelines" (A/AC.105/C.1/2018/CRP.18/Rev.1);

(e) A conference room paper by the Chair of the Working Group entitled "Working Group on the Long-term Sustainability of Outer Space Activities: guidelines still under discussion" (A/AC.105/C.1/2018/CRP.19);

(f) A non-paper by the Chair of the Working Group entitled "Possible General Assembly resolution on guidelines for the long-term sustainability of outer space activities".

4. The Working Group recalled that its fifth intersessional meeting had been held in Vienna from 2 to 6 October 2017 and noted that it had been a constructive meeting.

5. The Working Group noted that, in addition to the meetings that the Working Group had held during the present session of the Subcommittee with the benefit of interpretation services, the Chair and interested delegations had also held extensive informal consultations on the margins of the session, discussing preambular text, guidelines for the long-term sustainability of outer space activities, and the final report of the Working Group.

6. The Working Group agreed that it had made progress at the present session of the Subcommittee, and confirmed that consensus had been reached on the preamble and on the text of the following guidelines, as reflected in the conference room paper referred to in paragraph 3 (d) above:

(a) Guideline 6: Enhance the practice of registering space objects;

(b) Guideline 11: Provide updated contact information and share information on space objects and orbital events;

(c) Guideline 14: Perform conjunction assessment during all orbital phases of controlled flight;

(d) Guideline 15: Develop practical approaches for prelaunch conjunction assessment;

(e) Guideline 23: Promote and facilitate international cooperation in support of the long-term sustainability of outer space activities;

(f) Guideline 24: Share experience related to the long-term sustainability of outer space activities and develop new procedures, as appropriate, for information exchange;

(g) Guideline 30: Design and operation of space objects regardless of their physical and operational characteristics;

(h) Guideline 31: Take measures to address risks associated with the uncontrolled re-entry of space objects;

(i) Guideline 32: Observe measures of precaution when using sources of laser beams passing through outer space.

7. The Working Group noted that the Chair of the Working Group would produce a document that would be translated into all the official languages of the United Nations, containing the text of the agreed preambular paragraphs and all the guidelines agreed to date, together with the guidelines still under consideration.

8. The members of the Working Group shared the same vision, namely that consideration of the guidelines contained in the conference room paper referred to in paragraph 3 (e) above would continue. The Working Group noted that the conference room paper referred to in paragraph 3 (d) above reflected consensus achieved at the present session of the Subcommittee on the preamble and nine additional guidelines. The Working Group also noted that the nine guidelines were not the full second set of guidelines at the present time, and that the document did not prejudge final decisions on the compendium of guidelines or methods of future work, pending consideration of those issues at the sixty-first session of the Committee.

9. The Working Group noted that it was unable to agree at the present session of the Subcommittee on the content of its final report.

10. The Working Group agreed that the Chair of the Working Group would consult with the Chair of the Committee and with the Secretariat regarding the scheduling of the sixty-first session of the Committee so as to give the Working Group the opportunity to meet during that session, following the UNISPACE+50 high-level segment, to benefit from interpretation services.

11. On 9 February 2018, the Working Group considered and adopted the present report.